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THE

Missouri Dental Journal.

A

MONTHLY RECORD OF MEDICAL SCIENCE,

DEVOTED TO THE SPECIALTY OF DENTISTRY.

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A MONTHLY RECORD OF THE SCIENCE.

Vol. III.] JANUARY, 1871. [No. 1.

EXPERIMENTAL RESEARCHES ON THE SPINAL CORD.

By MM. Masius and Vanlair.

The authors commence their memoir with a histological examination of the *filum terminale* of the spinal cord of the frog. At its posterior extremity this *filum* is exclusively formed of layers of epithelial cells, surrounded on the outside by the *pia mater*, and enclosing a canal which ends in a *cul-de-sac*. More in front they find, beyond the epithelial mass, some large multipolar cells, with nucleus and nucleolus (nerve cells) lying between the pia mater and the epithelium; still more anteriorly, they observe pale, varicose, and longitudinal nerve-fibres, the existence of which Kölliker had already pointed out. At the point of convergence from the coccygeal canal, the stratum of radiating cells and fibres gradually becomes thicker as far as the origin of the tenth spinal nerve. The prolongations of the nerve cells are continuous with those of the epithelial cells. Upon the lateral and anterior faces of the *filum terminale* at this point, the multipolar cells approach each other and admit in the narrow intervals between them longitudinal fibres, to which they at length give place. The authors compare the results of their labors with former works on the same subject, with reference to man and the frog, and conclude that the *filum terminale* of the adult frog resembles the human spinal cord checked in its development, so that each segment of the *filum* represents one of the

successive phases through which the human cord passes in its primary formation.

The second part of the memoir has reference to the experiments which the authors made to determine the corresponding cutaneous and medullary regions (*territoires*) of the spinal nerves of the frog: a subject already handled by Peyer, Türk, Krause, Eckhardt, and Koschennikoff. The results agree more or less with the last-named author. They prove further that there is no root presiding exclusively over the perceptive (*consciente*) sensibility, and that the cutaneous region, the irritation of which provokes a perceptive sensibility, is for each nerve the same as that which can produce a reflex action; an observation which is opposed to Marshall Hall's hypothesis regarding the excito-motory fibres.

Passing to the medullary region of the posterior roots of the frog, the authors admit that all the fibres for perceptive sensations ought to end, directly or indirectly, in the brain; but there are centres, especially at each root, which regulate the reflex movements. Their results, as regards the positions of the centres of reflex action, agree on the whole with those of M. Koschennicoff, but in detail they present marked differences, which the authors explain by the inconsistency both of the cutaneous regions and of the points of emergence of the roots. To avoid as far as possible the diminution of irritability consequent on so serious an operation as opening the vertebral canal, they made each experiment upon an uninjured frog, by a single cut, and then tested the persistence of the reflex excitability. An autopsy was subsequently made, and the distance measured between the cut and the emergence of the root. This last was rendered more visible by coloring the fibres with hyperosmic acid. We will not enter upon a description of the results obtained, but content ourselves with observing that there is a series of successive centres. The centre of each root commences immediately behind the preceding root, and ends immediately behind its own origin, being therefore upon a transversal line which joins the points of emergence. Behind the tenth pair the cord is not the seat of a reflex centre. The nerve cells of this

portion send out sensitive and motor fibres towards the tenth pair, but the cells of these fibres do not communicate amongst themselves, as they would of necessity do if the reflex movements, which fail at this point, were present.

After these preliminary studies, the memoir treats of the anotomical and physiological researches, made by the authors, on the reproduction of the spinal cord in the frog. Schwann, from whose report on this memoir we have compiled this abstract, was the first who verified the reproduction of the nerve trunks in the frog; the reproduction of the cord had never been clearly proved by anatomical or physiological researches. Recently, M. Voit has shown that in pigeons, the hemispheres of the brain can be reproduced after extirpation. According to the authors, the want of success of the experiments upon the reproduction of the cord in frogs probably proceeds from the season, and the too great age of the animals. They have operated on little frogs full of life, and those experiments only which were made during the winter (that is from November to the end of February) were successful. The authors were not content with simply cutting through the cord, but they actually removed sections from one to two millimetres in length. After about six months the healing was complete, and all the functions had returned. These latter came back in the following order: — First, the spontaneous fibrillary movements in the thighs, then voluntary movement of the whole thigh, extending gradually to the knee and the foot. The perceptive (*consciente*) sensibility only appeared more slowly, and sensibility and the power of reflex motion were the last to present themselves. The autopsy and microscopical examination of the reproduced cord, showed that the end of the cord in front of the section was a little swollen, as in the case of nerves that have been divided; the posterior end was rounded, and between the two ends there was a substance, at first gelatinous, in which they found multipolar nerve cells, and nerve fibres in the form of Remak's fibres and varicose fibres. The cells appeared before the fibres. They found besides in this gelatinous mass, and in the two ends of the cord, near the point of section, nerve cells in a state of pigmentary degeneration.

Such are the principal results of this interesting work. It fills up a gap which existed in our knowledge of the reproduction of nerve tissue, and closes the list of numerous new observations upon the anatomy and physiology of the cord and spinal nerves of the frog.—[*Medical Times and Gazette.*

THE PHYSICAL NATURE OF VITAL ENERGY.

By Lionel S. Beale, M. B., F. R. S., Professor of Pathological Anatomy in King's College; Physician to King's College Hospital, etc.

The conviction that it is "*only* by recognising the *physical nature* of *vital* energy that we can ever hope to establish therapeutics on a firm and sound basis" has, perhaps, led Dr. Ferrier* to express himself rather decidedly against some views which I ventured to put forward some years ago, but which I am ready to give up as soon as convincing evidence shall be adduced in favor of the physical doctrine of life.

If Dr. Ferrier will explain what is meant by "molecular organization" and "molecular machinery," he will serve the cause he has at heart far better than by attacking me; for, as he must have gathered from many of my remarks, I am quite as anxious for light as any one can be. What I desire is to learn in what particulars the "*living*" resembles and differs from the "*non-living.*" I am quite ready to admit that one living thing is only some other living thing, or dead thing, or non-living thing, "variously modified" "under sundry circumstances," by "subtle influence;" but I should certainly like to have the meaning of these very comprehensive phrases explained. A man may be said to be dust "variously modified;" but consider what is comprised in the "variously modified!" And perhaps I may be permitted to ask why, if it is right to attribute the marvellous phe-

*Introductory Lecture on Life, etc. (British Medical Journal, Oct. 22nd).

nomena of nutrition to "subtile influences," am I to be condemned because I prefer to employ provisionally the simple term "life" or "vitality" or "vital power?"

It is *possible* the "molecular machinery" may be discovered; but at present it is absolutely unknown. It has never been seen, and no one has yet told us what it looks like even in his imagination. But yet I must admit that it is *possible* such machinery may be beyond the microscopic limit. The imagination of *highly gifted persons may* be able to conceive the structure and mode of action of the molecular machinery of the existence of which they are perfectly certain, although it has not yet been rendered evident even to their sense. Nay, I will admit further, that a *sufficient* intelligence might be able to predict from the properties of its component parts, the character which the offspring of any given piece of "molecular machinery" will assume after it has continued to grow and multiply, say for a thousand years. But do such suggestions enable us to unravel the mystery of the life of even the simplest thing now alive, or to determine in what particulars a *living* particle differs from the same particle *dead;* or why a portion of a mass of living matter moves upwards as well as downwards, or in what manner it takes up non-living matter, and communicates to this its own properties, and divides into separate portions, every one of which possesses equal powers? It may be answered, "These phenomena are due to the properties of the molecular machinery which has long been known to exist in the imaginations of highly gifted persons; and, although as yet no one has succeeded in actually producing such machinery artificially, the efforts of philosophers tend towards such a consummation!" But surely no observer, no worker at science, will feel satisfied with such statements as these; and a few will probably agree with me in thinking that, although it be in a sense unphilosophical, it is neither inconsistent nor absurd to entertain the opinion that the vital phenomena of living matter which was derived from pre-existing living matter is due to a peculiar power; although at the same time I object to accept the view that the action of a steam-engine, which was not produced by a pre-existing steam-engine, is due to a "steam-engine principle;" and I con-

fess it appears to me very extraordinary that many advocates of the physical theory of life cannot be convinced that the analogy they draw between a machine, which does not make itself, or grow, or multiply—and living matter, which seems to do all these things, is so very slight as to be beyond every limit except that of the fancy. If those who support the view which Dr. Ferrier so strongly advocates could explain by physics and chemistry (*a*) *the movements*, (*b*) *the growth*, and (*c*) *the diversion of any particle of living matter of any organism in this world*, they might have some excuse for the very positive statements they make about the *physical theory of life.*

People are beginning to doubt whether, after all, living things are really so like machines and crystals and physical bases, and complex albuminoid matters in a state of rapid chemical change, as they have been led to believe them to be. And people are also beginning to doubt if those who have spoken so positively on the physical side really know much more than any one else knows about the nature of life; although, from their very decided manner, it was natural to believe they possessed very peculiar and perfect knowledge of the subject. Whether the physical theory of life would have resisted much better the "*furious onslaughts*" that have been made against it, if some other course had been pursued, is a matter of opinion; but it is quite certain that some of the strongest supporters of the doctrine are modifying them still further. Those who have watched for ten minutes, under a high magnifying power, the varied movements of the nutrition of that living matter, will not easily be brought to believe that such phenomena are due to physical and chemical changes only. The number of such observers increases daily.—*Brit. Med. Jour.*

DISEASE FUNGI.

Translated from the "Zahnartz," by Rudolph Mathews, from the "Zeitschrift für Parasitenkunde," by Drs. E. Hallier and F. A. Zürn, Vol. 1. No. 3.

The number begins with, "Researches on the Phenomena of

Fermentation," by Dr. Oscar Klötsch. Unfortunately we must review much which is already known, before we arrive at anything which is really new and important.

This is true, also, of the foregoing article. Therefore, we omit the preface, which has for its subject, "Fermentation as an act of Fungi, in which a Peculiar Process of Decomposition is Exhibited," and intend in passing, merely to show the difference between rapid putrefaction and slow decomposition. By the slower process, nitric acid is produced, by the more rapid, ammonia.

The author declares, with Klencke, that the miasmatic and contagious forms of disease are dependent only on fungi, the nature of which are distinguished by their forms.

He thinks, further, that the Asiatic cholera is produced by a fungus, which is capable of growing on certain kinds of fruit, and therefore, advises that such fruits be washed before they are eaten, or that some kind of spirits be drank, which will destroy them in the stomach.

Exhalations rise also in rooms to the ceiling, and there form a stagnating vapor, which by and by accumulates in such quantities as to fall and mingle with the heavier gases. By longer stagnation, there is developed an aeriform moisture, passing on to fermentation, which falls down, covering the furniture of the room, and is of so intense a character, that it becomes perceptible to the smell. By this means, miasmatic infections are developed and disseminated, as well by atmospheric air as by other means.

Driven down by the rain, the infection is conveyed in drinking water, and farther scattered by favorable conditions, and especially fruitful sources are sewers and cesspools.

The assertion which we have made before, is again repeated, "that the germs of these infectious diseases, which have hitherto, after every investigation, remained undiscovered, may yet be found out through the phenomena of fermentation."

Under the head, "Consequences of Fungi in the Domain of Organic Nature," we find a list of diseases of birds, insects, &c., which are produced by fungus growths.

The teeth and their fungi, are also taken into consideration,

and the views of Bruck, Wedl, Magitot, Leber and Rottenstein, as well as those of Löviason, on caries of the teeth, are all similar. As the result of the experiments of the latter, there appeared penicillium crustaceum, bacterien, and spirallien, on potato. Penicillium, plesophora herbariorum, leptothrix and aspergillus glaucus on Liebig's extract of flesh, &c., &c. In short, every investigation gave new proof of the proverb, "The forms of the fungi differ according to the substances on which they are produced."

By the mere application of carious tooth substance to a sound tooth (in a glass bottle filled with water and kept warm), a carious place was produced in it. By this experiment, as the author says, the contagiousness of caries is proven beyond a doubt.

The cultivated fungi of a citron, produced caries in a sound tooth.

The result of these and several other investigations, is that caries only begins when all the conditions necessary to its production are combined. Fruit commences to rot when placed in contact with decayed masses, and the place of decay is always at the point of contact.

The microscope shows plainly that the caries fungus sends growing fibres to the interior of the substance on which it grows, which pierce through the external surface and grow and multiply in the interior.

The hair and skin:

Favus is produced by contagious fungi, (achorion rows of the penicillium crustaceum and puccinia fava). From an observation of the author, mentagra is produced from favus. A father tending on his son who was sick with favus, was so covered with the parasites, that mentagra was produced in his beard.

Tinea circinnati, and microspora mentagraphites are found in sycosis, and Anderson declares the fungi of sycosis and mentagra to be identical.

Particles from decayed teeth have produced mentagra on the chin. The author thinks a full beard is a protection against mentagra, and contrary, that a newly shaved beard opens canals where the fungus spore can enter. It is thought that per-

haps the soap-box, lather-brush and razor, convey such diseases from one to another, and that therefore it is advisable to have your own razor. Also, that the often-used napkins of barbers contribute their share of the infection.

Porrigo decalvens and pityriasis are produced from the aspergillus species. In one case, psoriasis apparently came from pityriasis. Injections of yeast and penicillium into the central veins of a dog, produced the same result, viz., inflamed spots and knots on the feet.

In a person suffering from psoriasis, with whom all care was taken, and the disease apparently completely cured, but in whom it always returned, the same fungi were found in the blood, as were on the diseased skin.

Diphtheria gave mostly penicillium. Syphilis gave spores with strong brown membranes, and especially in cases where the syphilis was inoculated from different individuals.

The extract of flesh appeared to be a poor substance for the production of fungi.

Among the many substances tried as disinfectants, were the following:

Permanganate of potassa did not kill the germ.

Alcohol and sulph. ether destroyed the penicillium completely, but not the germs of fermentation.

Beechwood creosote produced an eschar upon which germs again formed.

Chloride of iron injured them.

Carbolic acid did not destroy them completely, for in thirty-six hours new sprouts were observed.

Nitric acid acted the same.

Lime-water produced a weakening of the vegetation; on the contrary, concentrated caustic potash destroyed the fungi completely.

Dilute caustic potash acted the same.

Alcohol, ninety-six per cent. the same.

Concentrated sulph. acid destroyed all.

Yet, while the author quotes Dr. Löviason's method of preventing caries, and retaining the teeth (which is said to have

only a similarity to the "Filling of the common dentist)," and then without giving the methods, quotes the assertion of Dr. Löviason as incontestible truth: "No tooth should be extracted, but the most skilful efforts made to save even the worst," he concludes with the assurance that the medicated soap of Dr. Leber and Rottenstein has proved itself the best, and then concludes the combined results of his investigations in the following principles:

1. The process of fermentation is only continued and accompanied by the lower forms of fungi.

2. It is the same universally distributed forms of fungi which are capable of producing certain diseases.

3. Through certain agents, these germs are promoted, checked or destroyed.

4. The checking or destroying of the fungus elements is called disinfection.

5. Disinfectants must be chosen according to the substance on which or in which these germs grow.

6. In dry places, ninety-six per cent. alcohol acts best.

7. In fluids, caustic potash is especially adapted.

8. There are apparatus, and substances, by which these forms can be exhibited with certainty.

9. The controversy on the nature of the ferments cannot be decided until they are observed immediately under the microscope.

Operative and Surgical Dentistry.

OFFICE JOTTINGS No. 2.

Hydrate of Chloral.

Having made considerable use of this drug in my practice for some time, and as information in regard to its effects seem to be much sought, it may not be amiss if I say something of my experience. This I can do best by giving some examples which illustrate the effect of given doses.

Case 1.—Miss L., about fourteen years old, rather nervous. Fillings required in the incisors; dentine exceedingly sensitive. I gave her fifteen grains of hydrate of chloral, and after about twenty minutes began the operation. I could not discover any effect whatever from the drug while operating, and the patient claimed that no effect whatever had been produced. However, after the operation (which lasted a little more than an hour), she was left to herself a few moments and went to sleep almost immediately, and slept about two hours.

Case 2.—Miss C., aged fourteen years, nervo-sanguine temperament. Central and lateral incisors to be filled. At a previous sitting I had ascertained that this was a case of extremely sensitive dentine. Administered twenty grains of hydrate of chloral and waited thirty minutes. During the operation, she was rather languid, and that dread of the approach of an instrument seemed to be much abated; yet I could not discover that the pain was sensibly modified. Patient claimed that she felt no effect whatever from the drug; but when we were through with the operation, two hours after she took the dose, she found herself so sleepy that it was with difficulty that she could be kept awake.

The next day I gave the same patient thirty grains of the

hydrate, and proceeded to operate after half an hour. This time the effect was very decided. The patient took no notice of what I was doing, except when I was excavating sensitive portions of the cavity, then she roused up at once, and cried out as lustily as if she had had no hydrate, but the instant we stopped cutting she was at once composed. When the excavation was completed, and we commenced introducing the gold, she went to sleep, and continued so until the filling was completed. As she seemed to be in a good condition for operations, I introduced a wedge as tenderly as possible between the incisors of the opposite side. She was wide awake in an instant. Allowing her to remain quiet a few moments, she dosed again, and I proceeded to excavate; but the instant the excavator came in contact with the sensitive dentine she was wide awake, but dozed again while I was trimming the margins or other parts which were not particularly painful. After the operation, the patient slept between three and four hours, and waked up feeling as well as before.

Patients generally describe the feeling produced by the hydrate of chloral as being exactly the same as that caused by the loss of sleep, and their appearance suggests the same idea. I have never, except in one case, seen anything that could possibly be considered an evil result. This was in the case of a lady aged about thirty. I opened a cavity in the buccal surface of a wisdom tooth, which I found exceedingly sensitive. I gave her thirty grains of the hydrate, and then filled a small cavity in another tooth. The action of the drug was as marked as usual, but she contended that it had not affected her at all, yawning at the same time much as she would be expected to do after having sat up all night. She was as fretful about being disturbed as a child roused from sleep. After the operation, she complained of "a swimming in the head" and sick stomach; she described the sensation as being almost identical with that produced by whirling round for a considerable time. In about an hour and a half after she went home, I called at her house and found her lying on a sofa, but not asleep, as I had expected—still complaining of the same sensation, which had become rather more aggravated. She

had not eaten anything; I directed her to drink a cup of strong coffee, and fix herself comfortably for a sleep. At night I called again: she had followed my directions; had slept about two hours, and awoke, feeling as well as before.

This is about the substance of my experience. The effects produced by a given dose have been very uniform, varying much less than might be expected in different temperaments and ages.

The hydrate of chloral seems to be strictly a sleep-producing agent, but not a pain obtunder. In this respect it differs widely from the narcotics and anæsthetics.

It requires but little hydrate of chloral to put a patient to sleep. If not disturbed, the sleep seems to be perfectly natural, and on being disturbed, the patient wakes in the same manner and as perfectly. If we give more, they are more difficult to arouse, and go to sleep again sooner. The greatest benefit my patients seem to have derived from its use is that the dread of the operation is in a great measure overcome, and the disposition to sleep causes them to take less note of time, rendering the operation much less tiresome. These two points seem to me fully sufficient to justify its use. I have never given enough of it to be able to excavate a sensitive cavity without pain, or even very materially to diminish it.

The following formula is the best I have been able to devise for its administration: Hydrate of chloral, xxx. grains; Syrup ginger, i. f ℥; Ess. Lemon five drops.

This is not at all disagreeable to take. It may be mixed in any quantity, and kept for any length of time, if closely corked. A table-spoonful of this mixture contains fifteen grains of the hydrate. Syrup of lemon may be substituted for the ginger.

ENLARGED MAXILLARY SINUS.

Case in Practice, reported by P. C. Branch, Vinton, Iowa.

Mrs. K., aged about forty-five, presented herself for examination. She had for two or three years, suffered a great deal from

engorgement of the antrum. Had been frequently temporarily relieved, by lancing through the roof of the mouth—at first employing a physician, and afterwards doing it herself "to save expense."

Four months before coming to me, she had consulted a dentist, who recommended the extraction of her teeth, and commenced the operation; but (according to the patient's statement), was compelled to desist, after removing the incisors and bicuspids, on account of excessive hæmorrhage, which he *failed* to arrest by dusting the mouth with dry tannic acid; but which came very near strangling the patient, by its powerful stringent effects upon the muscles of the pharynx.

After this splendid *coup de* dentist, he dismissed her without attempting to treat or prescribe for the engorgement. I found the socket of the right lateral incisor open, and an elastic probe passed through it into the antrum, and back to a point opposite the first great molar, and a little to the right of the centre of the palatal arch. Pressure applied there and directed forward, forced half a tea-spoonfull of extremely offensive matter through the socket of the above mentioned lateral. The cuspidati were sound and in their places. But their necks were denuded and their alveoli pushed outward and forward, in a very unsightly manner, indicating considerable exostosis of their roots. Indeed all the living teeth in the mouth presented similar indications.

TREATMENT.

Extracted the teeth and roots. A few dead roots were partially absorbed, but the others were both enlarged and elongated —some of them enormously.

Prepared an elastic probe, wound it with raw cotton, commencing at its (bulb) extremity, and winding spirally along the shaft to a point that would be external to the opening when the probe was introduced as far as it would go. Saturated the cotton with dilute carbolic acid, and probed the cavity thoroughly, pressing the extruding cotton firmly against the shaft of the probe, to prevent its being left behind when withdrawing the probe.

Instructed the patient in the method of probing as above; and

after giving her a probe and the dilute acid, dismissed her, with the request that she would call on me when she came in town again. (She lives ten miles away, and is a poor widow, dependent upon her neighbors for a chance to ride.) She called about a week afterwards, and reported pain all gone, discharge diminishing, and no longer offensive. Made no change in the treatment, except to probe less frequent. Have seen her three times since. The last time, four weeks ago, no pain, no discharge, socket closed up, and the engorgement cured, and general health much improved.

I venture to send you this, because I believe that where it is practicable, the probe treatment is more efficient than the common practice of injecting remedies into the diseased cavity.

From "The Dental Cosmos."

CLINIC OF DR. J. E. GARRETSON, UNIVERSITY OF PENNSYLVANIA.

Reported by De Forest Willard, M. D.

Tumefactions of Lateral and Submaxillary Regions.

It accidently happens that the four cases which you see before you, present themselves to-day, laboring apparently, under like affections. Each patient has, as you perceive, great tumefaction of the lateral and submaxillary regions,—each face is greatly out of drawing; and what I would have you particularly remark, each presents a different expression of suffering. These persons came to us, of course, for relief, so I proceed before you to obtain a proper comprehension of each case, so that with certainty and accuracy I may employ the means demanded for cure.

We acknowledge, to begin with, that these faces are swollen from a cause or causes. We infer that if we discover these

causes, and can remove them, that nature will quickly effect the cure.

Case I. We take, first, this hearty, healthy-looking girl. Look at her face in the bright light in which I place it, and you will see that the enlargement or tumefaction is perforated by three openings, and that from these openings is a discharge of pus. These openings, then, are the orifices or outlets of sinuses, and they lead, necessarily, to that something or somewhere which is the cause or seat of the disease.

From experience, I infer that this patient labors under one of three conditions,—alveolar abscess, necrosis of the jaw-bone, or caries. I think that without any examination I can certainly say that one of these troubles affects her. Alveolar abscess is, as we have studied, a formation and discharge of pus from a periosteally diseased tooth. The nerve or pulp of a tooth, from some cause or other, inflames; this inflammation extends through the foramen to the periodonteum, terminating in the suppuration of this membrane. The pus thus formed, while generally evacuated on the nearest surface, as in the ordinary gum-boil, not unfrequently pursues tortuous routes, opening on far distant points—as for instance, the neck, or even the chest. An alveolar, or more correctly speaking, an alveolo-dental abscess, uncomplicated, is expected to be cured by the removal or other treatment of the offending tooth.

Is this case one of alveolo-dental abscess? We will open now the mouth, and if the disease is one of this nature, there will be found every evidence of it in the existence of some badly-conditioned tooth, teeth or roots. A puffy, sinus-riddled face like this, if dependent on dental abscess, will show loose teeth, or roots of teeth, in a turgid, congested gum—every phenomenon, indeed, of chronic inflammation being present.

In this mouth I see no such phenomena. The teeth are all sound, and the gums, particularly about the alveolar borders, are firm and rosy-looking. This is not, then, a case of alveolo-dental abscess.

On the conviction, therefore, that we have caries, or necrosis of the jaw, we fall back. A necrosis is death,—the death of a

part. Necrosis may be full and complete, involving a bone in mass, or it may be partial, destroying only a limited part. In the maxillary bones it is seldom that we have more than a limited necrosis. The dead portion separated under such circumstances is termed the sequestrum.

A sequestrum thrown off from the body of a bone may lodge and be retained in the soft parts, keeping up a discharge long after the original acute action, or inflammation which exfoliated it, may have passed away. These retentions of sequestra are very common in our clinical experience. If in this instance we have such a condition, the sequestrum will be readily discovered by the probe, which I shall now introduce.

I feel dead bone. A piece of dead bone feels to the probe like a piece of hard wood, or like lead, or soft gold, differing thus from the healthy bone, which is obscured by its periosteum; and differing also from the dying, sloughing bone of caries, in the absence of the pitted, soft, irregular face, which always marks the latter condition.

Doubtless, then, in this case before us, we have necrosis, and without questioning the patient, I am sure it is one of long standing. Were it not so, there would not be such a total absence of acute conditions. A sequestrum has been thrown off, months ago perhaps, and has ever since remained cooped up in the tissues; further examination will surely reveal that the dead bone which I felt is disconnected from the jaw. Plainly enough with this sharp probe, I catch and can move this bone as anticipated. We are, then, assured in our diagnosis, and it remains but for us to act. What shall we do? I will show you.

[Note. — The patient was here etherized, and a grooved director being passed through one of the sinuses, until at length it distinguished and rested upon the bone; the sequestrum, which proved to be a portion of the ramus, was cut down upon and removed. After the wound was syringed, the edges were brought together and compressed by the ordinary adhesive strip, the patient being sent away with the assurance of a speedy cure. Inquiry elicited that the disease had existed for over two years, and had resulted from injury done the jaw in an attempt to extract a wisdom tooth. — De F. W.]

Case II.—Almost in apperance, (superficially viewed), this is the counterpart of the first. Observe, however, that upon this face, there is but a single fistulous opening; and that is a fair, well-defined round hole, and not a teat-like projection. The face, too, to the touch, differs; it is much softer, has more heat in it, it is much more sensitive to impressions. Whatever the disease may prove to be, it is assuredly more recent than the first. It has not been in a condition of abscess more than three days—of this we may be satisfied.

To obtain our diagnosis we make some inquires of the patient.

Query. How did this trouble begin?

Answer. My face began to swell, and my jaws grew so stiff, that, as you now see, I can scarcely separate the teeth.

Query. But you had first a bad tooth-ache?

Answer. None at all, sir. My teeth are all sound.

Query. How old old are you?

Answer. Twenty.

This is all we need know of the patient to direct us in our course. We will now use the probe. No dead bone is to be felt. It is then neither a case of necrosis or caries. Must it be, then, alveolar abscess? Not necessarily. It might be an abscess of one of the submaxillary ganglia; or it might be an inflammation and suppuration, the result of a closure of the Stenonian duct; or it might be a case of follicular stomatitis. She has had no bad teeth, but she is twenty years of age. I think I can guess what her trouble is. At about this age the wisdom teeth are due, and it often happens in contracted jaws, that there is no room for these teeth, and so they are jammed away far back under the angle of the lower jaw, and it is impossible for them to erupt. The worst oral inflammations I have ever seen have been induced by such unborn teeth. Let us look into this mouth. As I supposed, back of the second molar, which itself rests almost against the ascending ramus, is to be seen a single cusp, or point, of the advancing wisdom tooth; for the whole crown of this tooth to get into the dental arch, looks to be an impossibility, yet, day by day, and hour by hour it is growing, and crowding, and wedging its way forward. We need

search no further for the cause of offence in this case. A very plain indication is to remove the irritation. How shall we do it? I should like the wisdom tooth out; but then to remove a wisdom tooth with but a single cusp through the process, with the jaws partially anchylosed, and the whole side of the face exquisitely sensitive, is not so comfortable a matter, — for the patient, at least. Happily, however, we can meet the indications in an easier manner. I will extract the tooth in front of it, thus, as you see, affording plenty of room and allowing the wisdom tooth to fall forward. We can assure the patient of her recovery in a week.

Case III. — This boy, with a similarly swollen face, has had his trouble, as his mother tells me, for a period of over four months. He is very timid; we shall have to etherize him.

[The patient here etherized.]

In passing the probe into the sinus, which, with its teat-like projection, you can plainly see upon his neck, I at once come upon dead bone, and the denuded surface seems quite extensive. I judge we have here necrosis of a rather extensive nature. I now look into the mouth. The teeth on the affected side — that is, the two deciduous molars, and the first permanent — seem really as if floating in a pulpy mass; pus is oozing from about their necks, and the general disorganization seems complete; without inquiring, we may affirm by the appearance of these teeth, which are much decayed, that in them the trouble originally commenced by pulpitis from irritation; the inflammation extending to the periodenteum, destroying this tissue, and was in turn directed to the neighboring bone, involving an ostitis of such extent as to result in death of parts to the degree which we are shortly to observe. Finding thus the trouble, the only question which concerns us is his relief. This, as an acute state of the disease is entirely passed away, will consist in the removal of the parts made foreign, *i.e.*, the dead or necrosed teeth and the bony sequestrum.

[Note. — Operation performed by first removing the teeth; next enlarging the cloacæ along the gums, and with bone forceps

seizing and lifting away the sequestra, of which there wree found three, involving nearly the full circumference of the bone. — De F. W.]

Case IV. — Here is a poor woman whose case must elicit our heartiest sympathy. Her jaw has been broken by a brick thrown at her from a passing wagon occupied by some drunken brutes of men. The swelling is as you perceive, alike in appearance with those just shown you; but if you observe closely you will see here all the evidences of an acute condition; the parts are not only swollen or engorged, but red, hot, and excessively painful. There are indeed here all the phenomena of active inflammation; more than this, you will notice that her jaws are fixed and stiff, the result of the lymph exuded into surrounding parts. Associated with this fracture and injury to the cheeks is violent periostitis; attention to this last is the very first indication of the case. We must, and should, not attempt anything until this inflammation is subdued. Its cure is much more important than any attention to, or consideration of, the fracture. Indeed, uncombatted, the fracture would be complicated with necrosis, and this would be, in her destitute condition, a heavily added misfortune. We must by all means try and secure resolution. To do this, I shall direct, first, the application of leeches, — ten Swedish or twenty American, applied about the base of the jaw. She will also have her feet placed in hot water, as hot as can be borne, this pediluvium to last at least fifteen minutes; she will have, as a point of counter-irritation, a blister made between the shoulders; she will be given, as a derivative, half an ounce of sulphate of magnesia, and when the bleeding from the leech-bites has stopped, she will have the whole side of her face painted thoroughly with tincture of iodine, and immediately the parts steeped with cold water, medicated with sugar of lead and laudanum. As her pulse is full and bounding, — a marked expression of the inflammatory pulse, — we will order her tinct. of verat. virid. five drops, *pro re nata*. If treatment thus active fails to abort the threatened suppuration, we shall then have to treat the case from an opposite standpoint.

[The patient thus prescribed for was passed for the day, to have her treatment continued at a succeeding clinic. — DEF. W.]

NÆVUS.

Here is a case with which you will rarely meet in your clinical experience; certainly I have never seen a similar example. It presents itself in the person of a child eighteen months of age, who was brought to my office some weeks since suffering from a huge erectile tumor, which occupied a large portion of the right cheek, while another, a half inch in diameter, was seen upon the lateral frontal region, near the border of the hair.

The one upon the cheek was formidable in appearance and size, and while holding its method of cure under deliberation, I operated upon the smaller one by strangulation; it soon sloughed, and the base is now rapidly healing, — in fact, it pursued the ordinary simple course. Most singularly, however, as this process of sluoghing went on, I noticed, almost *pari passu*, a series of phenomena taking place in this nævus upon the cheek; it became at first red, then livid, advancing to dark purple, until, as the ligature above dropped off, its tegumentary covering also ulcerated, and the whole nævus became as you now see it, a sloughing mass. In truth, by curing the little one above, we have cured this monster below, for I have no doubt that as this dead tissue separates, there will be left but a fresh granulating surface, which will speedily heal. Now you all know by this time what a nævus is. I have brought before you many cases at our clinic; I have shown you their composition — a congeries of arteries, veins, or capillaries; I have told you that I preferred the name "erectile tumor," and have spoken of the various means employed for its cure (*vide* "*Dental Cosmos*," November, 1870). Knowing this, then, you will say, "How could this action have taken place? Was it an accidental coincidence?" No, I think not; neither was it, properly speaking, a spontaneous cure, for there was an evident perceptible cause, which was the ligation of the other tumor; and yet, if you ask me how this cause produced such a result, I shall be unable to give a positive answer.

One is in a position fed by the facial artery; the other depend-

ent upon the anterior temporal or supraorbital and frontal branches of the ophthalmic for its supply, at least in the normal state of the blood-vessel system. I can, therefore, only suggest as a reason, that there may be in this individual an abnormal distribution of the arteries, and that both these tumors have been nourished by the same trunk. Granting this, then it might follow that I had cured this large tumor upon the principles of the Brasdor operation for aneurism—*i.e.*, by interfering with the circulation in the terminal branches of this artery, I had developed a sufficient disturbance in the circulation of these larger vessels to set up an irritation, then an inflamation, and finally, a complete slough, producing thus a most desirable result from an unintentional and comparatively trifling cause. This may or may not be the true explanation,—certainly I can suggest none more resonable. Paget speaks of one or two cases of this kind, and does not attempt to give any explanation as to their occurrence.

Salivary Fistula.

Here is a young woman who has been troubled with an open ulcer on her cheek for nearly two years. Her difficulty commenced as an alveolar abscess from the second molar tooth, a disease, the varied results of which I so often bring before you at our clinic. And do you not remember last summer how I urged upon you the necessity of a thorough comprehension of the subject, since you would so often meet with its victims? (*Vide* "*Dental Cosmos*," October, 1870.)

This abscess opened not into the mouth, but burrowed upward through the buccinator, perforated the Stenorian duct, and finally opened upon the cheek, forming a fistulous track, which communicated not only with the roots of the tooth but also with the duct, in consequence of which we have both saliva and pus constantly exuding from this orifice. Here, then, are two indications to be fulfilled in the treatment. In the first place, the primary cause must be removed,—and this cause exists in the two remaining carious tooth-fangs, which will continue to exercise their irritating influence as foreign bodies so long as they remain in their present position; they must therefore be removed,

giving nature the power to complete the removal of the difficulty. In the second place, having removed the cause of drainage, the saliva must be turned into its normal receptacle — the mouth. This ulcer has resisted various treatments during these two years; for although its salivary nature was recognized, yet the underlying causes, these carious fangs, were not removed, and, as a natural consequence, the discharge continues, and must have an outlet. As these roots are below the margin of the gum, we shall use the "elevator" for their extraction. (Tooth-roots here lifted out with the elevator.) Now we have removed the exciting cause of all this difficulty, and will next try to cure the intractable ulcer upon the cheek.

What must we do? We must make a passage by which the saliva will find a more easy outlet, thus turning out of its usual channel and giving opportunity for repair. For the accomplishment of this purpose a strand of silk is threaded at each end to straight or curved needles as preferred, and these needles are then successively passed into the fistula and carried out through the mouth, leaving about a line of tissue between their two points of passage. Removing the needles, a loose knot is then tied, forming a short loop, or else the intervening tissue may be immediately strangulated and the loop allowed to ulcerate its way through. As this separation occurs, the saliva will take the course through this opening into the mouth, providing it has been made of sufficient size, and the external wound will usually heal of its own accord; still, it may sometimes require the stimulant of arg. nitr. I think that you would seldom be required to pare the edges of the external wound. This operation I prefer to that of Horner, where the whole tissue is cut out with a sharp saddler's punch, as you will find described in all your surgical works, works, since it is perfectly simple and reliable. Another mode of operating is by the use of a conical cotton tent, which is inserted into the wound after a puncture has been made entirely through into the mouth, its base being placed in that portion of the track situated nearest the inside of the cheek and the delicate apex of the pyramid at the external fistula. This, by its uneven expansion, will dilate the internal orifice, and permit the narrowing of

the external, when after a few days it may be removed, and a similarly-shaped cone folded of iron wire inserted in its place; the apex of which cone should consist of but a single strand. This will induce a patulous condition of the oral passage, while the fistula will diminish in diameter to the size of the wire; after which you have but to remove the seton, and all will be healed in two days.

Some of these operations will usually be found applicable; but in cases where the fistula is the result of extensive sloughs, as from cancrum oris, autoplasty may be required.

These salivary fistulæ you will find to baffle all your attempts by stimulants and caustics, and I would advise you to operate at once. The worst cases are those where some of the lobules of the parotid gland have been opened. And let me here caution you to be extremely careful in all your operations in the region of this gland, not to cut through that strong facia which comes up from the neck, known as the parotid fascia, for should you wound but a single lobule, a fistula may result.

[The two needles were then carried through, bearing the thread with them; a loop was made and allowed to hang loose in the mouth. In a few days it had cut its passage; the saliva had followed its track, and after a single application of arg. nitr., the girl reported in two weeks, entirely well. — De F. W.]

Mechanical and Miscellaneous Department.

THE NEW BASES, ALUMINUM AND PYROXYLINE.

From time to time during the year past, the profession has been notified of the fact that inventive minds were at work in the hope of developing something which should take the place of rubber and relieve the dentist from the oppression and extor-

tion of the Rubber Company; and now, as the year is past, and the permits of Uncle Josiah have expired, these inquiries are often heard: What shall I do about this rubber matter? Shall I renew my license? Is there anything I can use instead of the rubber, with equal success? Will aluminum or pyroxyline take its place? With reference to the first of these enquiries we do not propose to offer any advice, but will give the reader the results of our own observations with the bases named.

We have published several short articles during the year, relating to the use of aluminum as a base for artificial teeth, in the last of which we stated that it was being successfully cast by several different methods. We made this report from hearsay, not from personal practical knowledge. We have since seen the most of these methods demonstrated, and we regret to say that the degree of success is not what we had hoped. It is true perfect plates can be and are cast, but the knowledge, labor, care and pains required to insure success, so far exceeds that required in the use of rubber, that we apprehend that aluminum will never be adopted by the mass of the profession, as a substitute for rubber.

Of the different methods, as Loomis', Laurence's and Hollingsworth's, it will hardly be necessary for us to say anything further than to state that Dr. Hollingsworth's method is unquestionably the most practical, and consequently the best. We have tested his method pretty thoroughly, but not with that degree of success that was promised by the inventor. It will serve a very good purpose, but can never take the place of rubber with the mass of the profession.

Of Dr. Feemster's process we know but little, never having seen it. We only know that the metal is cast under pressure of hydrogen gas, which deoxidizes it, and prevents (as he claims) the shrinkage. Being anxious to get rid of the rubber curse, we were induced to spend some time and money in experimenting with aluminum, ourself, in the hope of adapting it to our purpose, and our efforts have been thus far only partially successful. Full sets with plain teeth, and partial sets, can be cast by the following method, with uniform success, if proper care be observed

in all the manipulations, and the result will be a better and smoother plate than is cast by any other method of which we have a knowledge. And we would further state that any member of the profession is at liberty to use it in his practice for the full term of his natural life, free of charge, by order of Hale & Eames, inventors of

A Method of Casting Aluminum Plates.

The impression is taken in the ordinary manner, with plaster or wax. If an air-chamber be desired, the form of it is cut in the face of the impression. The model is made of plaster and French chalk, equal parts; fine white sand may be used instead of the chalk, but is not so good. The model should be about one and-one-half inches thick, and of such form as to draw readily from a plaster mold to be formed around it. While the model is yet soft, a small eyelet, made from ordinary wire, should be set in the centre of the back, opposite to the face. It should be completely buried in the substance of the model, so that it will be no more than flush with the surface when the model is trimmed. In trimming, cut away from around the eyelet a little, so that you can grasp it with a pair of pliers; the object of this eyelet being to aid in the removal of the model from the flask. Grind the teeth, and articulate them as for rubber; place them in position with the trial-plate on the model. The trial or model plate should be made of sheet tin, lead, or wax. If wax be used, it should not be thicker than No. 20 gold plate. There should be no surplus wax, except at a point just back of the tooth or teeth. The trial-plate may pass up underneath the gum of a single tooth, but in no case should a particle of wax overlap the gum or edges of the teeth. When the case is ready for the flask, the plaster teeth, if there be any on the model, should be trimmed off, and if there be any under-cuts that would interfere with the removal of the model from the mold in the flask, they should be filled up, or better, cut out. The sides and other exposed surfaces of the model are now to be covered with tinfoil, to prevent the plaster adhering to it in flasking. Varnish should never be used for this purpose in this process. The foil

is made to adhere by moistening the surface with saliva. It should not cover any portion of the artificial teeth. The flask consists of an ordinary cast-iron sand-ring, about two or two-and-a-half inches in depth, of the form of the letter D, one end larger than the other. They may be had at any of the dental depots in nests of four sizes. A bottom is formed, of Russia sheet iron, to fit into the small end, as follows: A piece is cut the shape of the end to be fitted, but half-an-inch larger. Slit the edge all round to the depth of half-an-inch and turn it up at right angles with the surface; this turned-up edge passes up into the flask and retains the bottom when the case is flasked. A hole one inch in diameter, of the form of the bottom, should be cut from the centre. To flask the case, place the model, face upwards on a marble slab or piece of glass; several pieces of fine wire, about two inches in length, should now be set in the surface of the tried plate at right angles with it. If the case be one of two or more teeth, one tooth in a place, a wire should be set into the wax immediately back of each tooth. One wire will be sufficient for a block of three teeth: two or three wires should be distributed over the surface of the plate. The object of the wires is to form outlets for the escape of the oxygen which is forced out of the metal, when the flask is closed under pressure. Place the ring or flask small end upwards around the model. Mix an investment of equal parts of plaster and French chalk, or white sand, to about the consistency of thick cream; fill round the model in the ring, carefully allowing no air-bubbles to be retained. When the flask is full, place the bottom in position, letting the wires pass through the hole in the centre; be particular to have the bottom flush with the edge of the flask. When the investment is hard, remove the wires by drawing them out, warm the case slightly, (not enough to melt the wax), grasp the eyelet in the model with a pair of pliers, and tap the edge of the ring gently until the model is loosened, it can then readily be withdrawn. Remove the trial-plate and every particle of wax and tin from the mold and the model; cut small outlets in the sides of the model for surplus metal; with a small unannealed broach make three or four vents near the centre of the model by pass-

ing the broach through from the back to the surface. The model and mold should now be thoroughly dried; this may be done by placing them separately over a gas-stove or in an oven. When dry, put them together, place the case in a charcoal fire, heat up gradually to red heat. Having previously prepared the metal by casting it into an ingot, in size sufficient for the case, melt it in an ordinary crucible; when melted, and the case is red hot, take the case from the fire, remove the model from the mold by means of the eyelet and a pair of long nosed pliers, blow out the ashes and dust that may have fallen into the mold, and pour in the metal, return the model, place the case in an ordinary rubber press and force the model down slowly, till flush with the top of the ring; let it stand till cold. The case can now be taken from the flask and finished. To do this, first saw off all the surplus metal round the edges; dress down the surface with burrs and scrapers, and finish the same as rubber, except the polishing, which is best done with the burnisher.

PYROXYLINE.

Of this new candidate for professional favor, we know but little. We recently paid a visit to Chicago, where it has lately been introduced, for the purpose of seeing and testing it. We found the profession there, pretty generally pleased with its appearance; some were even enthusiastic over it, while others seemed to be a little distrustful of its durability. We saw no cases in the mouth, but heard from several, all satisfactory; saw cases in process of construction and had one adapted for ourself. Since our return we have put up a somewhat difficult case on this base, to the entire satisfaction, thus far, of ourself and the patient. Whether it will retain its shape in the mouth or no, is a question, as well as its strength and durability; time only can test it in these respects. Altogether, we are much pleased with it, and think it promises better than any other of the cheap bases.

As its name indicates, it is made of the same material as Rose Pearl, which in appearance it much resembles. It is manipulated entirely different from the latter, which we think makes it

far superior as a base. Compared with rubber it requires more time and much greater care and thoroughness to insure a good plate; these are objections which we fear will operate against its general introduction as a substitute for it.

From a circular received from the inventors, we learn that printed instructions, with the right to use it, will be sent to any applicant for the sum of $10.00. Unless these instructions are more explicit than those we have seen issued to agents, they will be of little use to a novice in the art; but few will succeed, if they rely upon such instructions. Every one should be taught orally in this process, to succeed. EAMES.

JOURNALISTIC.

The December numbers come to us freighted, as usual, with reports of cases, criticisms, reviews, results of experimental research, &c., much of which is interesting, and some that might as well have been left unprinted. But monthly and weekly journals must be filled, and in consequence of the existence of this necessity, many communications find their way into the medical and dental literature of the day, which under other circumstances would have waited long for a printer.

"THE NASHVILLE JOURNAL OF MEDICINE AND SURGERY,"

opens with an "original communication," which claims that Dr. Flint, in his Physiology of Man, has laid claim to originality in "the discovery of an excretory function of the liver, that had never before been described." Upon which he discourseth as follows:

"Can it be that the American physiologists of these latter days, because of their intense application to, and admiration of the experiments, facts, and opinions of co-workers living abroad, have ignored the worth of the labors of their predecessors in this country, and consequently are ignorant of premises that have been assumed and defended? If so, this work of our pres-

ent physiological teachers is in vain! If one of them affirms to-day, as new, an opinion that has been advanced and elaborately defended here but little more than thirty years ago, how soon, alas! how soon, will his own seemingly strenuous efforts, made professedly for good, be proven to have been weak and useless? * * * * But his assumption of honor as the discoverer of the excrementitial functions of the liver, ought to be, under the circumstances, promptly denied and the justness of the denial be properly sustained."

We would merely suggest, for the purpose of allaying the excitement of this very earnest criticism, that Flint has discovered "a new excretory function of the liver, consisting in the removal of the cholesterine from the blood, and its discharge from the body in the form of stercorine, and so far from claiming to have discovered that the function of the liver is "exclusively excrementitious," he teaches the very opposite doctrine in his "Physiology of Man."

We think a little closer examination of the "Physiology of Man," by the author of this criticism, would perhaps convince, even himself, that he has only discovered a *mare's nest* instead of an attempt "on the part of Dr. Flint," to arrogate to himself unmerited honors.

"A Blind Diagnosis," by F. O. Ticknor, M. D., illustrated by examples. The importance of making correct diagnoses.

"Two Cases of Unusual Fractures" are reported by Professor Paul F. Eve. One a fracture of the superior anterior spinal process of the ilium, and the other of a fracture of the sternum, both of which made rapid recoveries. Dr. Eve furnishes, also, for the JOURNAL a variety of "extracts from home and foreign journals," which being selected with much care and good judgment form an attractive feature for its readers. We notice the following among the extracts:

"Von Erlock and Lucke recommend spirits of turpentine as a remedy for common ringworm."

"JOURNAL OF CUTANEOUS MEDICINE."

"In the *British Medical Journal*, Dr. Richardson, in speak-

ing of anæsthetics, remarked that he gave the preference to bichloride of mytheline."

"Skin grafting is recommended for healing large chronic ulcers. It consists simply of transplanting small bits of healthy skin from a healthy part, such as chest or arm, and planting them in the midst of the ulcerated surface, confining them in place by adhesive plaster. These small bits, of the size of a "half-grain of rice," grow rapidly, and the ulcer is soon covered with a healthy skin."

The history of anæsthesia is treated by Dr. Bennett, at considerable length, and in the main, fairly, giving Morton the credit of using nitrous oxide successfully in 1844.

S. J. Cobb reports a case in which some fangs of teeth were pushed up into the antrum whilst endeavoring to extract them, and in about eight hours they were blown out of the nose, the opening from the antrum to the middle meatus of the nose having been much enlarged by necrosis of the ethmoid and inferior turbinated bones. Patient recovered under the use of carbolic acid and iodine solution, applied by a syringe to the parts.

From the "Clinical Lectures on Tumors," by Professor W. T. Briggs, we gather the following extract:

"The first point to decide in this case is whether the tumor is malignant or benign. * * * * * The length of time the tumor has existed, its strictly local character, the entire absence of a tendency to ulcerate or to multiply and propogate itself, and the healthy appearance of the patient, prove that it is benign."

"The Dental Cosmos."

The first article in the December No. of the "Cosmos," is by S. P. Cutler, M. D., D. D. S., Professor of Chemistry and Histology in the New Orleans Dental College, and is entitled "Nerve Fibrils."

The writer takes exception, particularly to some of the doctrines of Beale, relative to his (Beale's) "Views in Regard to the Termination of Nerve Fibres," and in relation to some remarks advanced by us at the meeting of the American Association at Saratoga, he quotes from the Transactions as follows:

"'Beale saw that the termination of the fibre, as described by his predecessors, was really not a terminal point, but only the point where it breaks up into an infinite number of fibrils in the germinal matter of the pulp.'"

"Now, there is room in the dentinal tubules for whole plexuses of these minute fibrils, and it is reasonable to suppose that they enter the tubules in common with the germinal matter, — the tubules measuring $\frac{1}{10000}$th of an inch, whilst the minute nerve filaments are but the $\frac{1}{100000}$th of an inch," Dr. Cutler says, "but he does not claim that plexuses do exist in the tubes, but that they enter the tubes with germinal matter, thereby presupposing the formation of tubes first, and subsequently, the entrance of innumerable fibres, along with germinal matter, into each and every tube.

"What does the speaker mean when he speaks of the entrance of fibrils along with germinal matter into the tubes? What particular period of tooth formation does he assign for this all-important event to take place? * * * * * Who has ever seen more than one solitary nerve fibril in a solitary dentinal tube? I boldly say no one ever did, or ever will see such a sight. * * * * * It seems that the speaker has somehow got the idea into his head that all nerve fibrils are about $\frac{1}{100000}$th of an inch in diameter," etc.

We will endeavor to answer these important questions. We suppose if this critic should happen to meet with a paragraph in a work upon mathematics which alluded to two lines running parallel with each other, he would innocently ask which won the race? Or if by chance he should read in Gray's Anatomy in relation to the internal carotid artery, that "it passes forward and inwards through the carotid canal," or that the chorda tympani "enters the cavity of the tympanum," we suppose he would have no idea but that the author had used the word "passes" in the same sense that he would use it in speaking of a boat which passes through the Erie canal, and the word "enter" in the same sense as he would use it if he would state that a horse enters a barn through the door.

We would, however, suggest that it is possible that Gray, in

these cases which we have just quoted, simply intended to convey the idea that the internal carotid extended through the carotid canal, and that the chorda tympani extended into the cavity of the tympanum; and it will scarcely be necessary to state further, that this would accord with the general use of these terms by the best writers upon anatomy, of the age. If we have been sufficiently explicit to be understood thus far, we hope the author of the criticism noticed above will be able to comprehend what idea we intended to convey when we spoke of nerve filaments entering into the dentinal tubuli.

But the critic enquires, "Who has ever seen more than one solitary nerve fibril in a solitary dentinal tube? I boldly say that no one ever did."

Now, we confess that it would be a very strange sight to see two or more *solitary* nerve fibrils in a solitary dentinal tube, but as no histologist has ever claimed to have seen even one nerve fibril in the dentinal tubuli, we do not understand the necessity of the emphatic denial which the writer has so *boldly* made, that no one has seen more than one in a solitary tube.

But he goes on to state, "it seems that the speaker has somehow got the idea into his head that all nerve fibrils are about $\frac{1}{100000}$th of an inch in diameter."

Now it plainly appears from the quotation made by the critic from our remarks at Saratoga, that these fine nerve fibres resulted from the breaking up of the larger fibres into an almost infinite number of fine ones, and those few fibres were some of them $\frac{1}{100000}$th of an inch in diameter. We forbear to make comments upon such blundering assertions as these. It is no credit to the dental literature of the day that our periodicals can not be filled with more creditable productions than that which we have just noticed.

We pass on to the next article in the Cosmos, which is entitled, "Alkalis and Alkaline Saliva—their Effect upon the Teeth." By E. H. Neale, D. D. S., Philadelphia, Pa.

This broaches an interesting subject for investigation—in fact a field that has thus far been but poorly cultivated. A case of necrosis of the lower maxillary bone, with treatment by Prof.

McQuelter, presents some points of interest. The questions usually to be solved in these cases are, how shall we trust to expectant treatment? and when is it judicious to actively interfere by an operation? The rule which was followed in this case, is to wait till the portion which has become necrosed becomes separated by the efforts of nature from the living bone, and then remove it. We should have been glad to have heard more of this case in relation to the prospects of a reproduction of the lost ramus and body of the bone.

From "Bleaching Teeth;" by Professor Stellwagen, we glean that for discolorization of the dentine, he recommends "repeated washing with a jet from a syringe and allowing it to soak for half an hour or more." If this does not suffice, use diluted nitric acid, which must soon be neutralized by an alkali, either chalk or ammonia.

"When blood has been recently clotted, it can again be rendered fluid by ammonia, and thus it assists in dissolving it from the pulp cavity."

In an extract from the *British Journal of Dental Science*, chloral hydrate is recommended for sensitive dentine.

In the "Proceedings of Societies," we find Dr. Truman reported as follows: "From experience I have been led to regard contour fillings as weak and unreliable," etc. "Dr. Eisenbray is entirely out of conceit with the so-called contour system of filling teeth. He has been forced to such a conclusion from experience with his own operations, and from observing the results of famous contour fillings of New York operators (who make a specialty of the system)."

Dr. Bonhill described his automatic mallet, driven by a galvanic battery, and thinks the galvanic current a valuable means of combating sensitive dentine.

In "Clinical Reports," Prof. Garretson, in speaking of neuralgia, says: * * * * "It is a fact, that eight out of ten cases of facial neuralgia can be traced directly to some disease of the teeth or jaws, * * * * * * * and as most common causes of this we may enumerate:

"1. Sensitive dentos.

"2. Exposure, direct or indirect, of dental pulp.
"3. Diseased state of periodentium.
"4. Confinement of pus or gas in pulp cavity.
"5. Granules of osteo-dentine in pulp.
"6. Sympathy.
"7. Recession or absorption of gums and alveolus.
"8. Eruption of wisdom teeth.
"9. Abrasion or wearing down of teeth."

In the

"CANADA JOURNAL OF DENTAL SCIENCE,"

we find the "Proceedings of the Quebec Dental Society." Dr. W. G. Beers delivered the address, in the course of which, whilst speaking of the passage of the law for regulating the profession in Canada, he says:

"We have hardly yet begun to realize the personal, professional and public advantages, accruing from the improved state of affairs in the Canadian profession. * * * The privileges granted to physicians, with respect to their accounts, have been extended to us, while before the passage of the act, we had to swear to our work and cost of material like a mason or plumber. Before the passage of the act, we had no protection from the hands of nomadic empirics; to-day they are entirely shut out."

In the proceedings of the Board of Trustees of the Dental Association of Quebec, we observe that notice of a motion was given to reduce the price of a license to those dentists who are graduates of *recognized* Dental Colleges. It seems that they have found out, even in Canada, that bogus diplomas are floating about the country, and they are careful to say "*recognized* dental colleges."

The November No. of the

"AMERICAN JOURNAL OF DENTAL SCIENCE,"

opens with an article by George B. Harriman, D. D. S., of Boston, Mass., upon "The Effects of Animalcules on the Teeth." We are informed that almost the first revelation made by the microscope was this extensive *source of life*, and that "this was in the

latter part of the last century, when the microscope was in comparative rudeness, as *Leuwenhœck* was experimenting with the instrument."

We were of the opinion that Marcellus Malpighi and Anton von *Leeuwenhoek* both experimented with the microscope nearly two hundred and fifty years ago.

The writer states that there are probably two hundred and fifty millions of animalculæ and bioplasms upon every cubic inch of salivary calculus in the mouth, and thinks the gums and alveolar processes are literally eaten away by these voracious bioplasms, as he states that he has "seen these bioplasms work their way to a single *epithelium* cell, taken from the mucous membrane of the mouth, and to all appearances suck away a small portion of its contents." Moral: Keep the mouth clean.

We think the scientific world will be somewhat startled by this wonderful discovery.

In the December number, we have "Vitality and Vital Forces," by Prof. H. R. Noel. This is a carefully written article, and as we cannot give a synopsis of it that will do justice to the author, we will commend it to the careful attention of the scientific *section* of the profession.

An article extracted from the *American Journal of the Medical Sciences*, by J. H. Bill, M. D., indicates that local anæsthesia may be produced by the use of carbolic acid. In a case of felon of the finger he says: "The finger was soaked for fifteen minutes in warm water containing three per cent. of carbolic acid, dried, and then a brush dipped in the concentrated acid, drawn over the finger in the course of the intended incision." The necessary incision in this case, and in several described, was made with little or no pain.

Another article from the "*Chicago Medical Examiner*," which was first published in a foreign journal and penned by Liebreich, says that fatal doses of hydrate of chloral may be successfully combatted by large hypodermic doses of strychnine. J.

THE "MISSOURI DENTAL JOURNAL."

The MISSOURI DENTAL JOURNAL, with the appearance of the present No., enters upon the third year of its existence. The two volumes which have been completed, are far from coming up to the standard which should be reached in dental literature, but we hope nevertheless, that some little light has been shed upon the "dark places" by its pages, and we trust that its influence upon the profession has not been entirely profitless. We have been encouraged in our work, by many kind words of cheer from our subscribers, and many have recognized the fact that Dental Journals are not "paying institutions," in this country, and have promptly paid their subscriptions, and thus relieved us from the embarrassment, so far as they are concerned, which too often results to publishers from the neglect of subscribers in this respect.

The JOURNAL has found its way, in the meantime, to nearly every civilized nation upon the face of the globe. Every State but one in the Union, has its subscribers, and copies monthly, are sent to England, France, Germany, South America, Holland, Central America, the Sandwich Islands, and other distant lands.

The price of the MISSOURI DENTAL JOURNAL has been somewhat higher than some of the other journals, but as it was to be an independent journal, and devoted to the interests of no particular advertiser who could afford to publish it for the use of it as an advertising medium, this was thought to be necessary in order to make it self-sustaining. After two years' experience, however, we have concluded to reduce the price to $2.50 to those who pay in advance, and for this year we will consider all as having paid advance, who remit by the first of March.

Those who have already sent us $3.00 will receive credit therefor on our books, and will only be charged $2.50 for the current volume; so they will have paid fifty cents upon vol. 4.

We have heard many complaints from subscribers, that all the numbers do not reach them. We mail the JOURNAL regularly to all subscribers, and if the post-office department fails to do

its part, we cannot help it, but we will nevertheless send again the missing Nos. upon application for them.

We desire it to be borne in mind that the MISSOURI DENTAL JOURNAL has always been printed in the last half instead of the first of the month, so it is not due as early in the month as those journals which are printed upon the first of the month.

We have sent the JOURNAL to a great many who have entirely neglected to pay for it, and we hope this notice will suffice to make them see the error of their ways and repent.

We acknowledge our obligations to those who have furnished us with valuable contributions during the last year, and we only ask of them to keep their *consciences clear* in the future, and many of them will do more writing in the future than they have in the past; "prove all things and hold fast that which is good."

We shall be obliged to our friends if they will furnish us reports of interesting cases, or anything else that may be of interest to the profession. We intend to spare no pains in placing before our readers all new modes of practice which can be of any essential benefit to them, as soon as we can satisfy ourselves of their utility.

We shall have more to say upon cheap bases before long, especially upon pyroxyline and aluminum, which may perhaps be of some interest to those who humbly stand with one hand in their pocket fervently praying father Josiah to allow them to drag out a few more years of their miserable existence.

We enter upon the new year with renewed health and energy, full of hope, and confident of the glorious future that is reserved for the Dental Profession. J.

DR. MORRISON'S BURRING MACHINE.

In reply to many inquiries, we take pleasure in calling attention to the fact that Dr. M. has at last perfected his machine, and is now at the East, making arrangements for its manufacture He expects soon to be able to supply all orders. E.

BAD EFFECTS OF CHLORAL.

A patient in Guy's Hospital, with aneurism of the thoracic aorta, being given half a drachm of chloral to allay pain and procure sleep, became unconscious immediately on the administration of the dose, with lividity and coldness of face and hands, and respiration only at long intervals, death seeming imminent for five hours. These symptoms passed off during the following day. In commenting on the case, Dr. Habershon remarked that it confirmed the opinion he had formed from observation of cases of pneumonia and bronchitis; viz., that chloral tends to cause bronchial and pulmonary congestion, through its action on the pneumogastric nerve, and that it should not be given where embarrassment to respiration is liable to occur.—*N. Y. Medical Gazette.*

DR. NICHOL'S IMPACTOR.

This little instrument, as its name indicates, is designed to aid the dentist in impacting the gold in filling teeth. It takes the place of an assistant at the operating chair. It is very simple in construction, and possesses some advantages over anything of the kind we have ever seen, viz: It is perfectly under the control of the operator, and can be made to give one or more hard or soft blows as desired, works backwards as well as forwards, enabling the operator to condense distal surface fillings as thoroughly as any other. We are informed by the inventor, Dr. Nichols, of Chicago, that it will soon be placed in the market.

E.

JOURNALS BOUND.

Any person desiring their Nos. of the "MISSOURI DENTAL JOURNAL" bound, can have it done in neat library style, turkey morocco back and corners, marbleized paper sides and spring back, by sending them post paid, to the office of the "Journal" No. 523 Pine street, for one dollar per volume. E.

From the Cleveland Herald.

ASSAULT AND BATTERY.

The other day a young lady called at the rooms of a well known dentist to have a back tooth extracted, which had given some trouble. The artist examined her mouth, and endeavored, according to the lady's statement, to argue her into the belief that she ought to have her front teeth pulled out, and have an artificial set put in—he would do the job for her cheap. She firmly declined, however; those front teeth had never gone back on her, and she was not going back on them. They had never given her any trouble, and she didn't want them out at all.

The dentist then administered "gas" to her, and when she was in the proper state, he proceeded to business. She says that, in a few minutes she was aroused to consciousness by the pain, and she discovered, to her amazement, that the irrepressible operator had "yanked" out *three of her front teeth*, and was evidently going to make a clean job of it. There was a lively scene for a short time, and a little while after a warrant was served upon the dentist by an officer of the law, upon the woman's affidavit, charging him with assault and battery.

THE ELECTRICAL PLUGGER.

From a letter just received, we learn that the Electrical Plugger, a notice of which appeared in the Journal sometime since, is completed. Dr. Brunell, the inventor, recently demonstrated its practicability before the Dental Societies and Colleges of Philadelphia, we are informed, with success. It is soon to be placed in the market by Dr. L. D. Coulk, 232, N. 11th street, Philadelphia. E.

We understand that Harvard Dental College has adopted the "O. C. White Head Rest," in their infirmary. The compliment is well deserved. It is unequalled in its adaptability to the wants of the operator. C.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] FEBRUARY, 1871. [No. 2.

(From the "Boston Medical and Surgical Journal.")

EPITHELIAL CARCINOMA.

An Abstract of Koester's (of Würzburg) recent Researches into its Nature By EDWARD WIGGLESWORTH, M. D. Read before the Boston Society of Medical Sciences, January 3, 1871.

In the fortieth volume of *Virchow's Archiv*, I published some investigations into a form of tumor which I called "cancroid with hyaline degeneration," and showed that it was developed from the epithelium of the lymph vessels. I can show the same now from cancroid generally, but as this is not to be distinguished from cancer I prefer to designate it by the term epithelial carcinoma. In this group I include cancers of the buccal mucous membrane and conjunctiva, these being nearly always epithelial. The doubt ever increasing as to what we are to call "cancroid" shows its artificial separation from cancer. The more exact our researches histologically, and the more we regard relatively younger stages of development, the less difference we notice between the two. Cancroid originally designated a benignant new formation in the skin, of a warty character; although Virchow insisted that a papillary growth should be called cancroid only when within the diseased tissue or organ alveoli are formed which become filled with cells of an epidermoidal nature, the malignancy being dependent upon the association of the two changes. Gradually the importance of the former change be-

came disregarded, and the change in the interior of the tissues considered as of primary importance, even according to Virchow, who alleges in support of his opinion the primary appearance of cancroid in bone.

A slight portrayal of the present condition of things and of my position in reference to the latest views upon cancer is all that I shall here attempt. An exhaustive examination of the nature of cancer and sarcoma, with an enumeration and careful revision of the literature thereto appertaining, I leave for two standard works which are already occupied with this subject, viz., the last volume of Virchow's "Tumors," and Lücke's elaborate treatise on tumors in Von Pitha's and Billroth's Hand-book of Surgery. To these may be added the various views in regard to the development of cancer collated by Naunyn, and with special reference to cancer of the skin, that most comprehensive treatise of Thiersch.

Simultaneously, however, with the adoption of these views, we break down the barrier between cancroid and carcinoma, since we find also in the tissues of the latter, cavities and alveoli filled with epithelial cells. If Virchow still holds a difference between cancroid and carcinoma, while confessing that there are no settled boundaries to the two, he does it rather out of practical, *i. e.* clinical considerations, "since the cancroid rarely, while cancer is usually, generalized." He considers, also, that in carcinoma the epithelial cells are contained in the meshes of a "newly-formed frame-work of conective tissue, which contains also vessels," while cancroid infiltrates only an old tissue. This, however, at least for cancers of an early period of development, is at variance with the views in regard to their development from connective tissue, according to which the commencement of both tumors must be the same.

Förster states a further difference, viz., that in cancer there exists neither a fixed form nor arrangment of the cells, and that the cells are separated by an intercellular fluid, whereas, in cancroid, the arrangement of the cells is typically prononnced, and their form that of flat or cylinder epithelium cells, which, moreover, are cemented together.

Cornil, Ranvier and Demonchy, while regarding both carcinoma and cancroid as epithelial tumors, "tumeurs-hétéradéniques" in the sense of Robin, hold nevertheless similar views." "Le carcinom est une tumuer formée d'un stroma fibreux dans les alveoles duquel sont continues des cellules non sudées entre elles. D'autre part, l'épithéliome pavimenteux ou cancroïde est constitué par du tissu épithélial soutenu ou non par un stroma fibreux." These various differences have, however, never been fully recognized.

The practical results of this uncertainty in diagnosis are shown in the opinions with regard to the malignancy of cancroid, which malignancy has been ascribed with every successive year to an ever increasing number of cases of cancroid, simply because cancers were included. Thus according to O. Webster, the proportion of malignancy in cancroid is 36.5 per cent.; according to Thiersch, however, more than 50 per cent. result in death from the return of the epithelioma. After the work of Thiersch appeared, in which he substitutes for cancroid the old term epithelial carcinoma, it was necessary to be more exact, since histogenesis separated necessarily an epithelial from a connective tissue cancer, whereas, if the epithelial nature of cancer cells is alone regarded, this must inevitably lead to the opinion recently pronounced by Waldeyer, viz., that no difference exists between cancer and epithelial cancer, which opinion is properly merely a consequence of the theory of Thiersch and Remack with regard to the origin of epithelial formations. By an entirely different route I have arrived at the same conclusion, *i. e.*, that there is no specific difference between cancroid and cancer, yet though I include cancroid under cancer, I am far from stating that all cancers are identical.

Formerly it was the general opinion that epithelial carcinoma was developed from the granular organs of the skin, though anatomical proof was never offered. Then came Virchow's work on the connective tissue, parenchymatous inflammation, and new formations, and immediately everyone, especially Webster, Förster and Billroth, espoused the theory that cancer was developed from connective tissue. His work was so plausible, that a hy-

pothesis advanced in 1854 by Remack has been largely forgotten. This was, that all epithelial formations must be developed from epithelial germs, just as, in the embryo, the skin, mucous membrane and gland epithelium can only come from the two boundary membranes. Remack admitted that he could not furnish the proof for the epithelium of the urogenital apparatus; this has, however, been done recently by His and Hensen, and since we know that under normal conditions connective tissue [middle germ membrane] does not possess the power of forming epithelium [horny membrane], it is improbable that other histogenetic laws prevail for pathological processes than for normal ones. Opposed to this is the fact that granulating sores cover themselves with epithelium formed from the connective tissue, though Thiersch thinks the formation is always from the epithelial periphery inwards.

Billroth next espoused this theory of Remack and Thiersch, disregarding his own previous labors and following the hypothesis of Hoffman, that cells from the rete Malpighi could wander to other parts of the body. Waldeyer next appears, and, going farther than all the others, attributes to all the cancers an epithelial origin. Opposed to these views are those of His with regard to the separation of true and false epithelium, or endothelium, which have at least this in their favor that they are based upon the actual development rather than on the various appearances of the epithelium. Naunyn describes the development of cancer and cancroid as if from the epithelium of the gall-ducts. Langhans gives cancer of the lungs a double plan of development, from the epithelium of the alveoli and also from connective tissue. O. Weber, while adhering to Virchow's views, thinks that the glands of the skin play a greater part than is generally conceded. So also Rindfleisch. Klebs makes a supposition which is strange indeed, but which, nevertheless, may go far towards clearing up many histogenetic processes now involved in obscurity. He says the original formation of epithelial cancer is from epithelium; its development, however, is due to the infection of connective tissues by epithelial germs; basing his assumption upon the observations of Recklinghausen with

regard to the participation of two different individuals in the production of cells [conjugation]; and to this unnatural and unlawful coition he thinks may be attributed the strange parasitic formations called tumors.

These German opinions seem to be too exclusive for the French school. Cornil, Ranvier, and Demonchy, hold that the cancer is an epithelial new formation, which, however, may arise both from glands and from connective tissue. The lymph vessels have thus far been regarded as merely paths for the hiding away of primary cancer, or, more recently still, as paths for its dissemination. The nearest approach to a reference to any direct relation between cancer and lymph vessels is perhaps where Virchow cites and criticises some passages from Broussais, though even here it is doubtful whether Broussais refers cancer to an inflammation of the lymph capillaries. The following passage is the one tending most especially in this direction:

"Dans ces cas, que nous avons déjà notés (suppuration du tissu cellulaire), l'inflammation se perpétue dans les capillaires sanguins. Il en est d'autres où elle semble bornée aux capillaires blancs, indépendamment de l'affection simultanée des glands et des faisceaux lymphatiques; c'est du moins ce que j'ai devoir conclure de l'examen de ce genre d'altération qui a reçudes moderns les noms de tissu lardacé, tissu squirrheux, ou encéphaloïde."

But even here it is only a participation of the lymph vessels which is spoken of. The first to point out the real connection between cancer and the lymph vessels was Recklinghausen. He assumed that the cancroid cylinders (cancroidzapfen) might be only the club-like swollen ends of the lymph vessels filled with cell proliferations from the epithelium of the lymph vessels, or even the latter alone. Later, in a discourse at Wurzburg, upon a tumor of the under jaw, he no longer restricts his hypothesis to the endings alone of the lymph vessels, and in this tumor and another similar one from the orbit I was actually able to prove the development from lymph vessels, and even from the epithelium of the lymph vessels, without participation of the connective tissue. Recklinghausen called attention, also, at this time to the anastomoses of the cancroid cylinders and to their cavities

[Lumen] here and there recognizable, facts naturally very favorable to his hypothesis. My own observations have been made upon about forty cancers of the skin, either fresh or hardened, or treated with silver, generally in all three ways and in the most scrupulously careful manner.

In general the microscopic appearances in cancer of the skin are, 1st, variously formed bodies composed of epithelial cells; 2d, a stroma of connective tissue containing vessels, in which stroma the epithelial vessels are embedded. In dry cancers this stroma nearly or wholly disappears; the epithelial bodies are crowded together and seem like solid masses of epithelial cells, which can nevertheless be picked apart into cancer cylinders, or into roundish bodies, in either of which we may find the "globes epidermiques," or "cancroid pearls," *i.e.*, onion-like balls of epithelium formerly held to be essential to the diagnosis "cancroid." They are, however, often lacking, and here the cylinders consist of smaller, more succulent, polygonal, flat or cylinder cells. Cuts into the youngest part of the tumor, viz., the periphery, afford generally this appearance, and one can see that the cancer bodies are not isolated in the connective tissue stroma, but generally connected so as to form a net-work. This picture is not readily obtained with a weak magnifying power, nor from preparations made with alcohol and carmine. This net-work has been noticed also by Billroth, Klebs, and Waldeyer.

In some cancers this appearance may be found everywhere, *e.g.*, in cancers of the eye-lids, of the conjunctiva, and in rodent ulcers; in others, chiefly in the periphery, *i.e.*, the portion most recently developed, so that the question of the development of these anastomosing cell-cylinders is really that of the development of the cancer itself. Supposing, as I do, these cell-cylinders to be changed or thrombosed lymph vessels, there are still other possibilities to be regarded, namely, 1st. the formation of cell bodies in the connective tissue which have grown towards each other and thus united; or 2d., the formation of new ducts from old glands; or 3d., the production of such cell-cylinders from the blood-vessels. The first two I shall consider later, when I treat of the changes in the connective tissue and glands in can-

cer; the last deserves mention only as an unproved supposition of Studener's, and though in cancer we find changes in the blood-vessels, yet I have never seen its commencement take place in them.

Are the anastomosing cell-cylinders altered lymph vessels? Those anastomoses are constant. That they have been overlooked is due to two causes: 1st., the preliminary hardening in alcohol or other media, or the employing of very different supplementary fluids and reagents in the examination of the fresh specimen; 2d., the general custom of making all sections of tumors perpendicularly to the surface. By the first method the most recent cell proliferations, which are also the most delicate while yet the most important, are in many cancers completely altered or even rendered invisible. Fortunately this is not a universal rule. The objections to perpendicular sections need only for their substantiation a few comparative trials on the part of the investigator. Where the cancer sends knots into the subcutaneous tissue, they should be freed from everything except the tightly embracing connective tissue and the lymph vessels which are still intact, causing them to arrange themselves concentrically around the knot, and pressing the lymphatic net-work more closely together. Some cancers, especially those of the eye-lids and conjunctiva, and particularly when these sink deep into the orbital tissue, will show the anastomoses, no matter in what direction the cuts are made. I would state here that the periphery where the cancer is still advancing is always the best place for examination; the flat epithelial cancers, the so-called ulcera rodentia, the best adapted for examination; the least adapted being the fissued cancers of the lips. If we examine good preparations, we obtain at once the impression of lymphatic net-work. The cell-cords are of variable thickness, with swollen and knot-like expansions, and meandering in their course; thick and thin cylinders are united, and the branch which connects them is now thicker and now thinner than the main trunk. Now a cord divides, uniting again perhaps farther on, and where several branches meet, we see the characteristic expansions. Above all we notice in many of the cords, especially in those where the

cells radiate like cylinder cells, a very plain central channel or cavity [Lumen].

This cavity has already been remarked by Billroth, Klebs and others. Some consider it the cavity of an embryotic gland duct. This is impossible, if we are really dealing with lymph vessels. Others consider it the result of the fusing or melting of the central cells. But the character of the cavity disproves this; it is clean cut as if bored out; the ends of the cells towards the cavity are unaltered, smooth and uncorroded; there are no remains of half altered cells, and when the cavity possesses any contents, it is simply, to all appearances, a clot. The regular cylindrical arrangment of the cells also around the cavity, shows it to be an original and not a subsequent formation.

As a rule, the cavity is bounded by a single layer of cells, more rarely by two or three. A greater number would intrude upon and obliterate the cavity itself, so thin are the cell-cords. Where the layers of epithelium are not cylindrical, but flat, there is more difficulty, of course, in detecting this cavity, and it is best found by a cross-cut of the cords. This is, however, an additional proof of their origin from lymph vessels, which are generally not cylindrical tubes, but simply flat fissures, whose walls are too thin and contents too scanty to admit of any expansion. This bulging takes place after the loss of their contents and with the stiffening of their walls by the formation of cylinder cells which support themselves by mutual pressure like the stones of an arch, thus furnishing the most powerful opposition to any pressure exerted from the outside. Add to this that the vessel may be or may have long been filled with contents which have prevented it from contracting and destroying the elasticity of the surrounding connective tissue, and we see how a cell band may become a cell cord. Where it remains a band with perhaps only two layers of pavement epithelium separated by a cavity, this cavity may be proved by our having to shift our objective more than the width of the upper layer of cells before bringing the lower layer into view.

* * * * * * * *

Some authors have stated that the cell cylinders are surrounded

by a membrana propria, which would be in favor of their development from glands. This error has arisen from the chemical reagents employed. For instance, by adding acetic acid to a preparation in which we have cell cylinders with radiating cells, the nuclei of the cells become darker and more evident to the eye, the protoplasma, however, clear and homogeneous, and the boundary lines of the cells nearly invisible. This protoplasma outside the outer row of cells, being distinctly bounded by the surrounding connective tissue, resembles a membrane. It is not to be isolated, however, and does not exist, and when picked apart gives up to each cell its proper protoplasm. Or, again, a small layer of the connective tissue close around the cell cylinder has become homogeneously mucous; acetic acid causes the cell cylinder to shrink, and the space left by it becomes occupied by the infiltrated and swollen connective tissue, or by a glutinous substance expressed from it, and resembles a membrane. The same effect is produced by hardening in alcohol, especially when the cell cylinder has a distinct cavity, as has also been noticed by Thiersch and others. This supports my theory, as such cylinders naturally could condense themselves into less volume than if they were solid, leaving the pseudo-membrane more evident. In the examination of fresh specimens the pseudo-membrane is never found.

A brief summary of the results we have thus far arrived at shows us that: 1st, in all cancers of the skin, and especially in their peripheral younger zones, may be found anastomosing cell cylinders; 2d, these anastomoses very often form a network which in its appearance and dissemination resembles the network of lymph vessels, and seems to represent a cast of them; 3d, in these anastamosing cell cylinders there is frequently a round or flattened cavity, filled either with a mass which breaks the light but slightly, or with one resembling a clot; 4th, in some cases blood-vessels permeate the cell cylinders; 5th, the cell cylinders are surrounded by no membrana propria.

Before we can be sure that these cell cylinders are merely altered lymph vessels, two more facts require proof, namely, the connection of the cancer cylinders with normal lymph vessels,

and the development of the cells which fill the lymph vessels, are produced in, upon, or instead of the walls of the same. The former I attempted to prove by means of injections through punctures, but failed, it being always the blood-vessels which became injected. I satisfied myself, however, of one thing, viz., that there was no connection between cancer cylinders and blood-vessels.

I next tried impregnation with silver, according to Recklinghausen's method. This does better if we remember that we are treating sections and not smooth membranes, and do not expect too much; for, though some tumors give a tolerable proportion of demonstrable preparations, others give but one in thirty or more.

The sections to be silvered need not be taken from a fresh tumor. Indeed, it is better to wait some hours before preparing them. Cuts should then be made from the periphery and horizontal. The the silver solution should be one-fifth per cent., and the secretions should be left in about half a minute. While in the solution the secretions should be moved about with the the needle, to wash off any *débris* of cells or tissue fragments, or else gently brushed either in the sclution or instantly in distilled water. If longer in the water the cuts become worthless, and it would be better to brush them after the reduction of the silver. This last is often needful. The cuts are then to be laid in glycerine, though if put up for preservation in this they do not last. The action of silver is the same here as everywhere. The connective tissue fundamental substance and the cement substance of the epithelial cells become uniformily brown, while the juice canals [saftkanälchen] and cells remain uncolored. The cell cords appear like bright bands in the brown stroma, showing only a fine network of brown lines, the colored intercellular cement substance of the cancer cells. When the anastomoses are frequent, the cancer cords resemble exactly similarly prepared lymph vessels.

A comparison of fresh preparations with silvered ones from the same place, is a sufficient answer to any one who may regard the cancer cords as embedded between the lymph vessels.

There is simply no room for both; they must be identical. Moreover, where the silvering is imperfect, the cancer cells may be seen through the fragments of the silver lines or even as a continuation of them. Sometimes, in spite of the coloration of the intercellular substance, the cancer cells remain visible, together with their nuclei.

The best method to show the identity of the cancer cords and the lymph vessels is simply to remove a preparation from the silver solution and let it color itself under the microscope; the cells fade gradually from sight and the intercellular substance becomes bright, then gray or violet, and finally brown. We find that the great epithelial cells of the lymph vessels are gone or altered; we find between the cancer cylinders only blood-vessels, never any lymph vessels; we find the arrangment of these silvered cancer cords corresponding to that of the lymph vessels, especially in the uppermost layer of the cutis, where they become thinner and send out terminal shoots into the papillæ; and also in their relations to the blood-vessels, with which they run parallel or over which they form bridges; and not unfrequently we find the smaller epithelial cells actually becoming larger, the silver lines growing clearer, more uniform, thinner, more deeply colored and meandering, till at length before our very eyes lie the large, long, polygonal or rhombic cells with wavy margins, just as in normal lymph vessels. This transition into normal lymph vessels may be gradual, or sudden; and with this transition the cancerous degeneration, dark from the thickness of the cells, becomes clear and bright and white. Nor only in the proliferations of the cancer cords, sometimes even in the middle of their course, we observe places where the cancerous degeneration has not yet occurred. This is, moreover, no example of one sort of cells covering and concealing another, but an actual substitution, the very thin scales of lymph vessel epithelium losing in length and width what they gain in thicknnss as they swell by the absorption of fluid, and taking on all sorts of epithelial forms from their mutual pressure.

By the treatment of silver we arrive, then, at these results:—

1. That the younger cancer cords and their epithelium demean themselves towards silver just as do the lymph vessels.

2. That they correspond perfectly to the lymph vessels in their distribution, arrangements and combinations among themselves, and in their relations to the bloodvessels and to the papillæ of the skin.

3. That they are not covered by normal lymph vessel epithelium; but

4. That the epithelium of the cancer cords becomes larger and more indented, and passes over into normal lymph vessel epithelium.

From these we deduce

1. That the cancer cords are formed from the lymph vessels.

2. That the first cancer cells are altered lymph vessel epithelium.

It will be interesting doubtless, to show how far the history of the development of cancer may be traced in preserved and fresh specimens, since treating with silver is a laborious process. The tumors were preserved in dilute alcohol or in Müller's fluid, the latter to be preferred, for though it must be renewed every few days to guard against the development of fungi, yet the cell elements, and especially the delicate epithelial cells, are better preserved by it. There are, however, very few tumors which keep well enough to allow our investigation of their entire development. The worst of all are the fissured cancers of the lips and all those which have a limited and localized field of attack upon the normal tissues; whereas cancers with mucous degeneration of the connective tissue usually keep very well. Acetic acid should not be used. Imbibition with carmine is of no use except to beautify the picture. The preparations should be examined in glycerine, which clears up the connective tissue. If the tumor has been hardened in alcohol, the cancerous lymph vessels will be found much shrunk, and the difference and sharply defined boundary lines between the cancer cylinders and the connective tissue will be less marked or absent. The cancer cylinders themselves, however, are often more evident, especially if they have acquired a yellowish tint.

My special object in examination of hardened specimens was to ascertain if certain sections [abschnitte] of the cancer cylin-

ders could not be directly recognized as lymph vessels with normal epithelium which had become visible. Such I found in the cancer cords already described, consisting of two layers of flat cells, with a fissure-like cavity, showing well on cross section, but requiring focussing of the object-glass when viewed on the flat surface. This is especially well shown where there is a defect in the upper layer, enabling us to obtain through this aperture a view into the interior of the tube. That these pale tubes are lymph vessels is shown by their form, size, mode of dissemination, branching, etc., the size and form of their epithelium with its indentations and irregularities. Nothing is lacking except the fine indentations shown after treating with silver, and these are probably the abnormal results of the silver treatment, since the same effect follows its use elsewhere.

There remain still two questions:

1st. Does the further cell-proliferation of the cancerously degenerated lymph vessels proceed likewise from the epithelium of the same?

2d. Does it proceed *solely* from these?

These questions will be best answered by an examination of fresh specimens, which in general give better results than those we obtain from the hardened tumors, though even the latter present no essential variations with the exception of the pseudo-membrana propria already mentioned.

The fluids used in the examination of fresh specimens should be as indifferent as possible. Salt water, solution of albumen, serum and aqueous humor, which are as indifferent as any mixtures of salt, nitre, carbonate of potash, etc., and yet every tumor is affected by each of them, often in a different way by each, individual tissue elements still more so, and most of all the young cancer cells which fade from sight after a short time. The boundary between cancerous lymph vessels and connective tissue is well shown in fresh specimens, especially in those cancers whose cells are succulent or cylindrical. It is least well shown in those cancers where the cells are spindle shaped, especially if at the same time there is much cell proliferation in the connective tissue, in which case we might believe we had

pure sarcoma before us. In general the difficulty increases the more the cancerous lymph vessels approach their normal condition.

The conception of epithelial cancer cells is quite extended, including pavement and cylinder cells, flat and even thick bellied spindle cells, cells with proliferations, cells with granular protoplasm and without well defined peripheries, etc. These all, however, pass over in many places into large, pale, long-polygonal, or rhombic epithelium, the protoplasm becoming clearer as they increase in size, the nuclei sometimes dull, sometimes well marked, but always preserving their contours, the nucleus corpuscles nearly always quite evident, and the peripheries of the cells in some cases showing knobs.

Several times I have seen cells, previously swimming free in the fluid used for investigation, arrive at a defective place in the wall of the cylinder, squeeze through and swim on inside of the tube; the microscope when shifted showing an epithelial wall both above and below them. This is rare, however, for a fresh preparation is lax at best, and when spread out upon the slide, the walls fall together, this being still further aided by the weight of the covering glass.

Where the cancerous degeneration proceeds from below upwards, I have several times detected these cavities beautifully shown from having been long distended by the fluid dammed up in them, which could not enter the cancerous vessels below, the connective tissue having thus lost its elasticity.

From our examination of fresh specimens, therefore, we arrive once more at the conclusion that the first cancer cells represent nothing else than the more or less altered epithelium of the lymph vessels. That the younger cancer cells is shown by the increase of the nucleus corpuscles, and the constrictions and divisions of the nuclei. The new cells can of course divide again, which answers question number one with regard to the further cell-proliferation of once formed cancers. There remains the second question, viz., does any adjuvant cause exist for the further cell-proliferation of cancers already formed?

It is possible that connective tissue cells may thrust themselves

between the already formed cancer cells, and, according to the hypothesis of Recklinghausen, produce by conjugation a more active cell-proliferation. Biesiadecki has noticed such an intrusion recently in inflammation of the skin, and I have seen also spindle formed cells between the cells of the rete Malpighi in the skin over a cancerous infiltration, and also in a syphilitic affection. Once also in small amount between the epithelium of a cancer-cord.

This proves at least that cells of a contractile character can effect such an entrance. The primary stage of cancer is, moreover, sometimes accompanied by excessive cell development in the surrounding connective tissue, as instanced by Waldeyer. According to the recent investigations of Cohnheim, Hernig and others, cells not only in pathological but also in physiological conditions, pass from the bloodvessels through the connective tissue, and into the lymph vessels; and, according to Recklinghausen, cells pass from the connective tissue alone into the lymph vessels, and appear there as lymph corpuscles. In cancer the obliteration of the lymph vessels would cause stagnation of fluids and cells, and heap up the cells which could no longer be carried away, whether formed in loco or arriving from the bloodvessels, which I have already said are generally dilated [ektatisch], a condition very favorable, according to Cohnheim, to the exit of the white-blood corpuscles. Then, too, with the growth of the cancer, the connective tissue contracts and disappears, and as we see no proof of the destruction of its cells by pressure or fatty degeneration, we may imagine at least that these may have been taken in and appropriated as cancer cells.

The "mucous infiltration," or rather degeneration of the connective tissue, most marked in the immediate neighborhood of the cancer cords, is best explained in the same way as the heaping up of the cells, *i. e.*, by stagnation in the vessels, especially as it is most marked in the so-called infiltrated cancers, where we have a large tract moderately affected, rather than excessive local affection, by which former condition the formation of a collateral lymph circulation is rendered less easy, while a diffused stagnation of fluids is favored.

(*From the "Medical Gazette," October*, 1870.)

INVESTIGATIONS ON THE NERVOUS SYSTEM.

By A. Waller, M. D.

Dr. Augustus Waller, in the Croonian Lecture for May, 1870, says that it is known that, after a nerve has been disconnected from the central organs, its medullary part undergoes a series of changes. The tubular medulla, or white substance, is disintegrated, and finally converted into a dark granular matter. On this alteration Dr. Waller founds his method of investigation, as it enables the inquirer to distinguish the altered from the sound fibres. The author applied his method to the elucidation of the functions of the ganglions or swellings found on the origin of many nerves. On dividing the roots of the spinal nerves, it was found, after a certain lapse of time, that on the posterior root, which is alone possessed of a ganglion, the central segment remaining in connection with the spinal cord became disorganized, and its elements passed into a state of granular degeneration, whereas, in the distal segments remaining in connection with the ganglion, the nervous elements retain all their normal structure, evidently showing that continuity with the spinal cord does not prevent it from becoming disorganized, whereas its connection with the inter-vertebral ganglion suffices to preserve its integrity of structure. In the divided anterior root, the phenomenon takes place in an exactly inverse manner from the former. The author arrives at the conclusion that the spinal cord confers on the anterior root that unknown vital power whereby its elements resist granular disorganization, whereas for the posterior root, on the contrary, the preservative power is no longer an attribute of the spinal cord, but resides in the ganglion. The author pointed out the important bearing these results had on pathology, that henceforth, in diseases of the spinal cord and of the brain, experimenters had to endeavor, in pathological examinations of those

parts, to ascertain in each case how far the alterations could be referred to the separation of a part from its tropic center.

The author then treats of the vagus, which, at its origin, is formed by roots springing from the medulla oblongata, to which is added afterwards a considerable branch from the accessories, which joins and mingles with the pure vagus, and with which its fibres become intimately blended. The problem to be solved, therefore, is the precise functions of each or of either (the accessories or pure vagus) before their anastomosis. Prof. C. Bernard had succeeded in entirely destroying the power of the accessories by evulsion of its roots, and had arrived at the conclusion that all the fibres of this nerve are distributed to the laryngeal muscles, whose functions are connected with the production of vocal sounds, whilst other fibres from the pure vagus govern certain nutritive or organic functions connected with respiration. In order to separate the functions of the one from the other, it is requisite to destroy all the fibres of the accessories by Dr. Waller's process, and leave the other intact, which has been done most effectually by Dr. Waller's plan, first disconnecting the accessories from the medulla on Bernard's plan, and afterwards allowing the animal to live sufficiently long for fatty degeneration to take place. The vagus then having been galvanized at every part of its length, it was found impossible to affect either the action of the heart or the stomach, and the only result is to cause slight movements of the larynx. The author then proceeded to the consideration of the pneumogastric and sympathetic nerves in man in health and in certain affections of the nervous system, and, lastly, referred to the effects of collapse and syncope produced by the irritation of these nerves. In general, the effects are confined to a state of depression more or less strong, which may be moderated by graduating the degree of irritation applied. He believed that this fact may be taken advantage of and applied as a means of inducing asthenia or debility for the purpose of facilitating certain operations in surgery, such as the reductions of fractures, or even hernia, in lieu of the administration of other anæsthetics, such as chloroform, etc., which present a certain degree of danger not attending the compression of the vagus.

Dr. Waller then cites a case of dislocation of the head of the humerus beneath the clavicle by a fall down stairs. After numerous unavailing attempts to reduce the luxation, chloroform was sent for to facilitate the operation by inducing anæsthesia, but in the meantime an attempt was made, assisted by compression of the vagus. One applied compression, whilst the other two operators performed extension and counter extension. In two or three minutes, just as the carotids ceased to be felt to beat, a sudden click indicated the return of the bone to the cavity.

Operative and Surgical Dentistry.

From "The Dental Cosmos."

CLINIC OF J. E. GARRETSON, UNIVERSITY OF PENNSYLVANIA.

Reported by De Forest Willard, M. D.

Double Harelip.

The case now before the class (a man thirty years of age), is that physical imperfection known as harelip. In this particular instance it differs, however, markedly from others which it has come in my way to treat before you, in being a compound or double cleft.

In the usual harelip, as all here well know, the deficiency consists in a V-break in the continuity of the parts. (*Vide* Dental Cosmos, Clinical Notes, August, 1870.) The double break varies as markedly as the first is true to a type. The case before us is a fair example of what you will meet with in this direction of practice,—it is not a complicated case; neither

is it a simple one. First, you observe a break involving one-half —or much more nearly two-thirds—of the superior lip,—an example of what is meant by deficient development. That Nature, however, attempted, but was thwarted in her work of making here a perfect lip, is evidenced in that we find hanging from the septum of the nostrils a misshapen, fleshy mass, the abortion, without doubt, of the lacking portion of the lip. This centre teat or part, in these cases, is the *pons asinorum*, and it is so various, so diversified in its relations to adjacent parts, that the question of concern in all such operations is, What shall we do with it? Here in the case before us, for example, is this teat, so outside the harmonious line of the lip that a strip which should rest upon the cutaneous surface of either side would pass beneath the mucous face of this middle piece.

As another example, I will here introduce a second patient: this infant, but three weeks of age. You have seldom seen anything more curious looking,—it seems to have a fleshy door-knob hanging from the tip of its nose. The child has scarcely the remnant of an upper lip, and what is a great deal worse, there is a complete break both through the hard and soft palate, rendering the nares and mouth a common cavity; and this cavity has neither anterior nor posterior closure, being thus, of course, always open. The babe cannot suckle; and when milk is poured into this cavity, attempt at deglutition throws about as much back as gets down the œsophagus. Observe this case particularly, and compare it with the first, since it enables me very well to show you the two extremes of complicated harelips. The pedunculated prominence hanging from the nose of this child is the rudimentary lip,—and who shall say how much of the absent palate enters into its composition? All the inside of the tumor is made up of bone; this the knife will be sure to demonstrate to us. The condition of this child is lamentable, and I shall exert myself to the utmost, you may be sure, for its relief.

In the mean time, until we come to the operation, consider it, each one of you, your own patient, and devise in your mind what kind of an operation you conceive best adapted to meet the requirements of the case.

From an operative standpoint we divide the subject of double harelip into two classes, simple and complicated. Such a division answers our purpose very well. Let me thus, for a single moment, refer to an uncomplicated double harelip, where the centre piece or teat might be found so large and square as nearly to divide the lip into three portions; now here the mesian line of the lip would be found in the centre piece; it would therefore, I think, suggest itself to any one that either side of the cleft was to be treated as a separate harelip,—that is, the whole operation may be very well done at one sitting, but there would necessarily be symmetrical parings made of either cleft. In such a case we have also to take into account the concavity made on either of the sides of our fissure, as reference is had to the influence exerted on the free margin of the lip; for here, of course, we require no swell.

Whether, again, in these really double cases, we would first operate on the one side, and when this was cured, on the other, is a matter for the judgment of the operator. Many surgeons prefer to correct the whole deformity at one sitting. If he should do this, the operation would only deviate from the principles laid down, as regard would be had to the approximation of the parts. If the centre piece were small, I think it would be found the most satisfactory practice to pass the pins directly from one lateral flap to the other, on through the central teat, thus uniting all these parts together by a common suture. If, on the contrary, the centre piece is broad and well covered by skin, I think the greatest good is found in using two sets of ligatures.

As regards the single or double operation, I myself am influenced by the width of the middle piece, the tenseness or laxity of the tissue of the lip, and the endurance and condition of the patient.

Another modification of the double harelip is one in which there is projection into the cleft of the incisor teeth, the alveolar process being sufficiently normal to allow of non-interference with it. The projection of the teeth is a natural result of the lack of external support from the labial deficiency; the tongue has actually pushed them outwardly. This explanation will, I am sure,

seem strange only to those who are unacquainted with the exceeding mobility of the dental organs under slight but continued force. It is certainly the true cause of such projection. In a case of this kind, the preliminary operation is the removal of the teeth. If, now, six months are allowed to intervene before attempting the operation on the lip, the alveoli of the extracted teeth will be found to have receded, through absorption, quite the eighth of an inch. The second operation is then to be done *secundum artem*. This waiting on the process of absorption will be found to conduce greatly to a successful result; but it is not a necessity.

A still better, though more tedious, mode of correcting such a deformity, is by bringing the projecting teeth back to their normal place in the arch through the agency of elastic ligatures, which is a perfectly feasible operation, and not at all difficult of performance. By such a preliminary procedure, we not only get the teeth out of the way, but we also save to the patient these valuable organs. To make and apply such a ligature, we have only to take a common slip of india-rubber, attach at either end a loop of silk, place the loops over certain of the molar teeth (it is immaterial which), and stretch the centre or rubber part over the labial faces of the teeth to be pulled back. It is astonishing how quickly and powerfully such a force will act upon the teeth, and in two or three weeks at most, they will be brought into proper line. To secure them *in situ*, and prevent their being again pushed forward, we have only to keep them ligatured in any convenient manner until the operation on the lip is made.

Cleft of the lip, as seen in the case of the babe before us, is found in almost every case of cleft of the hard palate.

It has always been deemed very important in these cases that an operation on the lip should be performed as early as possible, since it is thought to favor closure of the bony cleft. In these cases the operation differs from that suited to an ordinary one only where there is a projection of one or both alveolar processes into the break. In such instances, if the projection is very marked —that is, so much so as to prevent the bringing of the lips together over them—we may, perhaps, be able to do nothing better than to cut away the parts. This, however, is always to be avoided

when possible: first, because we thus destroy the germs of the teeth; and secondly, because if by any means we can get union of the lip, the parts in their development will come mutually to accommodate each other. In such cases, some authors recommend that we endeavor to bend back these juttings of bone, turning them in toward the mesial line, and when this can be done it answers a very admirable purpose.

Still another mode consists in the employment of the fronto-occipito-labial elastic sling, which pulls upon the projecting process backward from the occiput. It will certainly fulfill the indications, but its application is not unattended with trouble.

In cases of double harelip, when the centre slip is so associated with the septum of the nose as to make the parts appear as one, as in the babe before us, we might describe it as hypertrophied state of the septum, were it not for the loss of material in the lip. Again, the lost part from the lip is sometimes found attached to the very tip of the nose, giving to the patient the appearance of laboring under lipoma.

These variations, together with all the anomalies in this direction, are first to be studied, as regards their cure, from the artistic standpoint. The surgeon knows where and what he can afford to cut; he knows what nature will do in the case; it only remains for him to consider well his incisions,—where he shall make them, and what is to be the result, before the operation is attempted.

With this general review of the subject, which will, I trust, be found by you sufficiently full for a satisfactory guidance in this direction of practice, we may turn to the performance of the operation upon these cases.

First, the man. It is sad that he has been allowed to go to adult age with such a deformity. As this central piece is not wide, we can utilize it, and make a single operation suffice for both clefts; that is, we shall pare both edges of this central piece, then the edges of the lip upon either side, and passing long pins directly from the lateral flaps through this teat, bring all four raw surfaces into their proper position by one ligature thrown around the pins. In regard to the character of our incisions, it is not here so necessary to use the ellipse, or double V parings,

which I spoke of when upon the subject of simple harelip, since we do not here produce in the same way the central median prominence and swell, and our great object is, therefore, rather to produce perfectly fresh surfaces at every point, that union may be rapid and complete.

[Operation performed as described, the teat being used to fill up the gap between the two flaps, and a portion of one of the parings being allowed to remain in order to add to the fullness of the free margin, somewhat after the manner of the operation of Mirault. But two pins were used, and adhesive strips were immediately applied to assist in the support.—De F. W.]

In regard to this little infant, I trust you have all by this time decided as to the operation which you would perform were the case in your care. The child is but three weeks old, yet in these cases of such terrible deformity, the operation must be done early, since the compression effected even by the closure of the soft parts may at this tender age greatly influence also the bony cleft; for you well know the large proportion of animal matter which exists in the bones of young children, and the ease with which they may be bent. At some future clinic I shall dwell more fully upon the matter of cleft palate, and will not therefore now detain you

As you look at this curious projection from the nose, you will readily see that it cannot be utilized, and it must therefore be removed. This I shall do with a simple pair of bone-nippers, cutting it from the septum nasi, and, as you will then see, we will have to deal but with a simple cleft, the break, however, being very wide; yet I think there will be no excessive tension exerted upon the parts.

[The protuberance was then removed, the parts pared and drawn together as in ordinary cases, and long strips of adhesive plaster added. Hemorrhage was but slight. The mass consisted of bone and cartilage. The parts united well, and the child made a good recovery.—De F. W.]

GOLD FOIL, INSTRUMENTS, &c.

Another year has passed away, and not without leaving behind something valuable in experience. I find myself using, the last few months, about as much No. 4 adhesive foil as *heavier* numbers. No. 20 adhesive comes in very frequently, especially in those portions requiring *hand* pressure. It is also constantly used under the mallet. No. 30 is used *only* under the mallet. Either of these two numbers may be used folded double or quadruple more effectually than a single thickness of Nos. 60 or 120. The thicker the foil the smaller must be the point of the plugger. No. 60 foil requires a point as small as No. 28 of the gauge plate. No. 30 foil may very well be packed with a point as fine as No. 26 of the gauge. No. 30 foil may be double or quadruple, and packed with the same size point as a single thickness. No. 4 foil is better packed, if in pellets, with a point as large as 23 of the gauge. It may afterwards be consolidated with a point of the finest No., such as would be used for the heaviest foil. Excepting in contour plugs, I do not consider the *greatest* density of which gold is capable, desirable in a plug. No. 4 adhesive foil, I use in half sheets, rolled in loose rope, and cut in pellets.

I think I can make just as good a plug with one number as with another, by adapting my instruments and manipulations to the foil used. By adapting the means to the end desired, I can very profitably employ Nos. 20 and 30 in the same plug, at different stages of the operation. Too deep serrations have been the great curses which adhesive foil has had to endure ever since it was discovered. They have been, and are continued to be used blindly by the great mass of the profession, because introduced by some well known operators, who never seem to have employed any too much common sense in their valuable contributions to operative dentistry in this line.

Just examine the *flat* side of a No. 2 froid file. Now I think those cuts deep enough for the serrations of any plugger. Es-

pecially is this the case for the surface layers of gold on which you wish to make a good polish *without* burnishing. And here I will say that I consider the burnishing a plug, as a mode of finishing, a great humbug. The operator deceives himself as well as the patient. A plug whose surface is not condensed enough to make a good appearance with pumice stone and other polishing powders, ought not to be glazed over and sent out into the world to do hard work. Hard work will destroy its flimsy finery in a week.

I think it much better to get thoroughly accustomed to a few well-adapted pluggers, say twelve or fifteen, than a larger number. The points which I find myself using mostly are:

Two spirals, No. 28 of the gague.
" " No. 23 " "
One foot No. 28 " "
" " No. 24 " "
One straight No. 28 " "
" " No. 24 " "
" right angle No. 28 for hand pressure.
" " " No. 24 " " "
Two slight curved flat, No. 29.

The above are for adhesive foil. For cylinders of soft foil, I use several much larger and longer foot pluggers and some flat non-serrated instruments like a burnisher.

Referring again to *foil*, I find that every fourth book of foil, I purchase is Abbey's No. 4.

It is entirely useless to make cylinders of adhesive foil. The *adhesion* of cylinders amounts to nothing valuable, and it is sure to clog, if one cylinder touches another in endeavoring to pass it into the bottom of a cavity where there is not *more* than enough room. The *value* of cylinder fillings I have advocated on former occasions, and I say now that a dentist who does not understand the manipulation of cylinders so as to make a good plug with them, is not master of his specialty.

A dentist last week wrote me: "I have just seen some gold plugs which you put in thirty-two years ago, and the teeth are as perfectly preserved by them as though they had just been inserted."

This does not prove that I was a good operator, but it *does* show that soft foil cylinders can do as well as gold can be made to do.

Well, then, I feel sure that I shall never abandon "soft foil," and I have never for a week given it up since I was a dentist.

The cylinder question has been in dispute, as to its originality. Well, then, I have this to say: Dr. Frederick, my tutor, taught me to fill with cylinders, and never showed me any other way, at the same time saying: "There is but one other man in New England that fills teeth in this way, and that is Dr. Tucker, of Boston. CHASE.

From the London "Lancet."

SKIN GRAFTING.

To the Editor of the Lancet.

SIR,—Much has been written of late on skin-grafting. From my own experience of it in the hospital here, I can corroborate every statement that has been made on the subject. I think the practice of it is of immense consequence in the treatment of ulcers, particularly in the treatment of extensive granulating sores following burns, etc. It is quite unnecessary, however, to put the patient to the pain of cutting a piece of healthy skin from the body for the purpose of transplanting it on the sore. All that is necessary to be done is, to take a long bistoury, or razor, and shave or scrape off the epidermic scales from the convex parts of the extremities, such as on the outer and convex aspects of the forearms and thighs, and place them on the healthy granulations. This can best be done by brushing the scales off the bistoury with a camel-hair pencil. After securing them *in situ* for three or four days by means of common adhesive plaster, the granulations on which the epidermic scales were placed, assume a glazed bluish appearance, which gradually grows into skin, and meets the nearest edge of the healing ulcer, which edge shoots out, and

meets the newly-formed skin on the granulations. The result is a continuity of healthy skin. Such has been the result of the practice here, and it is not necessary for me to enlarge on the advantages of it.

It has been mentioned by some of the writers on skin-grafting, that the formation of the new skin is accounted for on the cell theory. I have no doubt that it is so, for, according to the observations of Schwann on the theory of the growth of the epiderma, these scales are nothing more than dried cells having a nucleus in them, though it is stated that they are scarcely apparent. Mr. Erasmus Wilson, too, states, in his work on Diseases of the skin, that the formation of the epidermal scales results from the desiccation of the cells. Now, if the scales are scraped off the skin and placed on healthy granulations, and kept on them for a time—say four days—is it not possible that the scales may imbibe serum from the plastic lymph on the granulations and adjacent tissues, and form cells, which ultimately go to the formation of skin? At all events, the practice of placing epidermal scales on a healthy granulating sore causes it to heal or skin over more rapidly, not only from the edge, but also in the centre of it.

I may mention that my colleague, Professor Pirrie, in his work "On the Principles and Practice of Surgery," makes mention of a case he had in which a large isolated portion of skin formed in the middle of an ulcer, and gradually increased in size till it joined that formed from the circumference of it. It is quite possible that the isolated piece of skin might have grown from an epidermal scale which had accidentally fallen on the ulcer.

I am Sir, your obedient servant,

DAVID FIDDES,

Aberdeen, Dec. 5th, 1870. Surgeon to the Royal Infirmary, &c.

DES MOINES, IOWA, Feb. 11, 1871.

EDITORS JOURNAL,—

I met rather a peculiar case in practice a few weeks ago, which perhaps is worthy of mention. A young man about twenty-five years of age was painting in my office, and during a conversation

with him I noticed that he did not close his teeth together, and as my curiosity was somewhat excited, I enquired of him what the reason was; he then allowed me to examine his mouth. His jaws were large and well developed, had lost no teeth, and with the exception of a few small cavities, were all sound, but the *second inferior molars* had grown up and tipt a little forward, and consequently struck the upper teeth before any of the others, and prevented his mouth from closing; when he had his mouth closed as close as he could, I could insert my finger between his front teeth. He said it had been that way as long as he could remember, and that he had always masticated his food with his upper teeth and tongue. I wanted to extract the teeth in order to allow his gums to come together, but he would not have it done at that time, and he has now gone to Missouri.

Case 2. A young man called at my office to have a tooth extracted; said it had been troubling him for a week. I examined his mouth, and found that he had been patronizing one of our *cheap dentists*, (who has been trying to farm for about six years, and is now trying to *pick* up dentisty). The pulp had been exposed in the right inferior second molar. He destroyed it, and filled with tin foil, without removing the dead pulp, the consequence was, it *ulcerated*, and I took it out. On examining it I found that it had but one nerve canal, and that the ulcer was on the fang having no nerve in it. In such a case how would you cure the ulceration? GEO. P. MANN.

Mechanical and Miscellaneous Department.

JOURNALISTIC.

The *Boston Medical and Surgical Journal* of January 5th has a very carefully prepared summary of the law of malpractice in medicine and surgery. From the decisions quoted in this

article it is easy to see that the ruling of the courts upon this subject is by no means uniform, but the law at the present time is pretty well exemplified by a decision of Baron Watson, in a case in which a blacksmith attempted to cure a cancer by the application of oil and "a white powder, which caused the greatest agony. The man died in nine days." The Judge "directed the jury to find the prisoner guilty, if they considered he took upon himself the responsibility of attending to a patient suffering from a cancer, when he, the prisoner, was not qualified for that purpose. If he used dangerous applications he was bound to bring skill in their use, and he, the Judge, thought that the prisoner's education and employment made the use of these dangerous substances almost amount to a want of skill. * * * The prisoner was found guilty and sentenced to three months imprisonment." But on the other hand instances are not wanting where the court held that if a charlatan acted from honesty of purpose and expected to cure the patient that he was not guilty of manslaughter, even if death did result to the patient through the ignorance of the practitioner. Such in effect was a decision of Chief Justice Parsons, but I believe that all agree that before the law there is no difference shown between the most arrant quack or impostor and the regular graduate of a medical institution.

In the Middlesex East District Medical Society, December 7th, a report was read by Dr. Winsor, of Winchester, chairman of a committee appointed to report upon the propriety of using galvanized iron pipes for carrying water which is to be used for culinary purposes. After a careful examination of the whole subject the committee report that they "know of no proof that water derives any poisonous or harmful quality from galvanized iron." The Society generally "concurred in the opinions expressed in the report."

A writer in the *Gazette des Hôpiteaux* states that epistaxis may be arrested by pressure of the finger, applied to a branch of the facial artery which passes near the ala of the nose, and

which can be felt by the finger in that location. — *Med. Gazette.*

Dr. S. Weir Mitchel, in the *American Journal of Medical Sciences*, states in regard to the action of the bromide of lithium, "that it is efficient in some cases of epilepsy when bromide of potassium has failed. That it is thus efficient in lesser doses than the salt just named. That as *an* hypnotic, it is superior to the potassium salt, and to the other bromides." — *Michigan University Medical Journal.*

The *Cosmos* for January, 1871, has an article from George B. Harriman, D. D. S., of Boston, Mass., upon "The Discovery of Nerve Fibres of the Soft Solids of the Dentine."

The author commences by referring to the various theories upon the sensitiveness of dentine, as follows:

"By some writers it is attributed to 'nervous irritability,' 'deficient growth of maxilla,' and to 'changes in the system on the arrival of puberty.' Other writers refer this sensitiveness to 'local chemical action,' and the 'pathological condition of the system.' Others affirm, whilst accounting for this sensitiveness, that 'we must of necessity fall back upon the supposition that dentine is the conductor of impressions to the pulp.'"

* * * * * * * *

"It may be noticed that cut No. 1 very much resembles others prepared by different microscopists, and should they view this specimen (as they can by calling at my office, where it will be preserved), under the microscope, they would, I have no doubt, all pronounce these thread-like lines, designated by figure 2, 'tubuli,' although, as I have shown, tubuli do not exist in the dentine."

"Figure 2 shows the thread-like lines, which are nothing more nor less than real fibres."

* * * * * * * *

"Figure 1 in this cut shows where the fibres form a junction, and it is within these fibres that *I have* discovered a small nerve fibril, which is represented and illustrated in figure No. 3 below."

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"Unless great care be exercised the thread-like lines (fibres) in cut No. 1 will be mistaken for nerve fibres."

* * * * * * * *

"Careful attention to the preceding considerations and illustrations must have satisfied the reader of the cause of sensitiveness in dentine."

We propose to consider these quotations from the article in question as briefly as possible.

Now the author doubtless intends it to be understood, by naming the various theories relating to sensitive dentine, that he considers these theories, or some of them, as the accepted theories of the day. If this was not the case why does he say "careful attention to the preceding considerations and illustrations must have satisfied the reader of the sensitiveness in the teeth?"

Now, it will not be necessary for me to state here for the benefit of any intelligent dentist of the present day, that this same doctrine, which this author advocates, relating to the cause of sensitiveness in dentine, was taught by Professors Johnston and Harris, of the Baltimore College, long ago, that it was advocated by Tomes many years since, and that it has been generally accepted by the most intelligent part of the profession; and that they therefore did not particularly need the "preceding considerations and illustrations" to satisfy them of the cause of sensitiveness in dentine. We shall expect in the next article from the same pen the startling announcement that he has discovered that the teeth are *masticatory* organs, and that we can now explain the manner in which the food is comminuted, and we have no doubt but that the author will be able to convince the most of his readers of the truth of this proposition.

As the author states, cut No. 1, which illustrates his production, very much resembles others prepared by different microscopists; and he continues, "should they view this specimen under the microscope, they would, I have no doubt, pronounce these thread-like lines, designated by figure 2, tubuli, although as I have shown, tubuli do not exist in the dentine."

It is not claimed, then, that there is any difference in the appearance of his specimen of dentine, and those prepared by others. No claim is made that the specimens are differently prepared, but we are very modestly informed, that the appear-

naces which have been supposed to indicate the existence of dentinal tubuli by such men as Tomes, Kölliker, Beale and Boll, to say nothing of Purkinji, Retzius, Müller, Owens, and a host of others, really indicate nothing of the kind. We admire the assurance of one who honestly believes that he alone of all microscopists has sufficient sagacity to discover that the thread-like lines in a specimen of dentine are not tubuli; and other microscopists will doubtless feel grateful to our author for warning them not to fall into the error of mistaking these "thread-like lines" for nerve fibres.

But we should not have spent so much time in the consideration of these points were it not for the subsequent announcement that he had discovered "a small nerve fibril in these fibres."

Now, the discovery of nerve fibrils in the dentinal tubuli, or as the author calls them fibres, is a desideratum earnestly desired by many, and has been a prominent object with many microscropists; but all their labors have hitherto proved fruitless, and if the discovery has really now been made by this enterprising author, we shall hail it as a triumph won in the profession, of which one may well be proud.

Whilst therefore earnestly desiring that these observations may prove to be worthy of confidence, we must confess that until verified by others, we can place but little weight upon this claim, made by one who, in the same article, shows conclusively that he is almost totally ignorant of the histological and physiological literature of the day.

The next article in the *Cosmos* is by Prof. Stellwagen, upon the File. We wish all articles in our dental journals were characterized by as much good sense. As we can make no extracts that would do justice to the author, we commend the article to all seekers after truth and sound practice in that direction.

A nearly fatal case from the nitrous oxide gas is reported by Chas. W. Sellers. After galvanism and artificial respiration had been tried without avail, the patient was resuscitated by flagellation, "with the end of a wet towel," applied to the chest.

From an article by Edward H. Browne, Lambertsville, N. J., it appears that nitrous oxide gas will preserve its power for at least thirty days after it is manufactured.

Chloride of Aluminium is highly recommended by Mr. John Gamgee as an antiseptic, (*Medical Times and Gazette*). We would suggest that it might be substituted possibly for creosote in some cases in dental practice.

The St. Louis *Med. and Surg. Jour.* This journal has a well known, wide-spread reputation, as one of the most able Medical journals in this country, and has been particularly noted for its well-written, concise and elaborate reviews upon the current medical literature of the day. This reputation was, however, principally won whilst these reviews were conducted by the editor-in-chief, and we are fearful that they will not in future be held in as high repute, if this business of reviewing shall be habitually *farmed out* to other parties as promiscuously as it appears to have been in the January number, which has just made its appearance. No editorial duty requires more general information, a riper judgment, and a stricter sense of justice, than is required for an intelligent, judicious and honest review of current literary and scientific productions.

Passing over several original communications and the reviews, we will give a few items from the valuable selections which are found in the present number.

We find an editorial from the *London Lancet* upon an essay, written by V. Sabbotin, of Kiew, on "The Origin of Fat."

The questions principally discussed are: 1st. Does a direct passage of fat take place in the animal organism from the intestinal canal into the adipose tissue? 2d. Do the fats develope within the elements of the adipose tissue? and if so, do they take origin from the albuminates, the hydro-carbonaceous compounds, or from both of these together? 3. Does a sympathetic development of fat occur in the animal organism in the mode suggested by Kühne?

Kühne supposed "that in the production of fat, glycerine on the one hand, or the fatty acids on the other, are absorbed from the intestines; and the compounds required in each case to make a complete fat, are formed in the body at the expense of albumen or albuminous compounds, the fat cells being the agents by which the union of the two is accomplished."

From experiments the author concludes that a direct passage of fat into the adipose tissue does *not* occur. Having fed lean animals on meat carefully freed from fat, the author finds an abundance of fat developed, so that he concludes that it must, at least in part, be produced from the albuminates.

In relation to the third interrogatory, it does not appear that the author arrives at any satisfactory conclusion.

An article by M. Baikow, also from the *Lancet*, appears upon "The Development of Bone from Medullary Germs."

The author's experiments in this direction were in a great many cases successful. He found that the medulla, after transplanting, first passed into the condition of fibrous tissue, from which by the proliferation of the cellular elements, bone or cartilage were developed.

Next is an interesting article from the *British Medical Journal*, by Edward Meryon, M. D., upon "Granular Degeneration of the Voluntary Muscles." The author thinks it an idiopathic disease, dependent probably upon a defective nutrition of the sarcous elements. Arsenic has thus far seemed to control the progress of the disease, to some extent, all other remedies tried having proved useless.

From the same journal an article from Dr. Noxon, in Gray's Hospital, recommends twenty-grain doses of bromide of potassium for ague, several interesting cases being reported, in which it had succeeded after quinine had signally failed.

The *Canada Journal of Dental Science* publishes a fee-bill, which it proposes for the country practice of Canada, commencing with small gold fillings at $2.00, extracting 50 cents each, single tooth on vulcanite $4.00 to $8.00, and other charges in proportion. We do not think the people ought to complain at these prices.

American Journal of Dental Science, for January, 1871. The leading article upon "Germinal Matter," by Prof. Noel, is a well written article, which clearly and forcibly sets forth the doctrines of Beale upon this subject.

Article fourth, by Geo. S. Yingling, M. D., recommends sesqui-chloride of chromium for sensitive dentine. The remedy, he remarks, colors the dentine green, but this disappears without any special treatment, and generally the color may all be removed by excavating the cavity.

The details are not set forth as clearly as we could wish, as it is not stated how long the medicine must remain in the cavity to produce a satisfactory result. We opine that it will be necessary to use it with considerable caution, as it seems to be an agent of great power.

Dr. John C. Storey prefers lead for packing vulcanizers, to rubber packing.

The *Dental Times* has for its leading article, "Dr. S. P. Cutler's Reply to Dr. Zur Neddin," who has criticised Dr. Cutler in a German journal, for only giving his method of preparing a pulp for microscopic investigations, when he had promised to publish his mode of discovering the millions of nerve fibres in the dentine of a molar tooth. The Doctor takes up most of the space allotted to the reply in trying to prove that there are millions of dentinal tubuli in a large molar tooth. We presume that Zur Neddin will consider this pertinent when Dr. Cutler shall have proved that there is a nerve fibre in every tubulus.

After making a mathematical calculation upon the number of the tubuli, he again gives his "method of preparing soft pulps, so as to demonstrate the fact long ago stated by myself, that the nerve fibrils were traceable through the pulp membrane into the dentinal tubuli."

A tooth is soaked in alcohol one day and several days in chromic acid, then filed down till its walls are thin, crushed, and the pulp removed and pressed between two pieces of glass and mounted in balsam, and it is ready for use. "The fibres withdrawn from the dentine may be distinctly seen projecting through the pulp membrane."

"This experiment clearly demonstrates the fact that the nerve fibrils are projected from the soft pulp into the tubuli," etc.

Now this, so far as one would legitimately conclude from the

author's own account of it, reaches the same point of demonstration which Tomes reached some ten or fifteen years ago, *i.e.*, he (Tomes) demonstrated the existence of projecting processes of pulp, which seemed as in this case to have been withdrawn from the dentinal tubuli; but he went still further and by another experiment proved conclusively that fibres did exist in these tubes. Tomes, with the modesty which characterizes scientific observers everywhere, did not claim that he had *demonstrated* by these observations the existence of *nerve* fibrils in the tubuli; but, whilst speaking of the difficulty of accounting for the sensitiveness of dentine, Tomes says: "The recognition of the dentinal fibrils will, I think, remove that difficulty and enable the physiologist to explain why, under certain circumstances, dentine is susceptible to pain, while under other conditions the sensitiveness is lost. That the dentine owes its sensation to the presence of the dentinal fibrils, cannot, I think be doubted."

Now, if the author of the "Reply," had only *demonstrated* that these projecting fibres were *nerve* fibres he would have progressed as far in his *discoveries* as Boll had already done, who first definitely proved that these pulp processes were, at least some of them, really nerve filaments. Boll's description of the methods of preparing his specimens and the concurrent testimony of his confrères suffice to show that he is claiming nothing but what his observations justify, and especially is this conviction strengthened in the minds of his readers, inasmuch as he states that he by no means claims that he has yet demonstrated the existence of nerve fibrils in the dentinal tubuli, because it is still possible that these projecting nerve filaments might not, after all, have been withdrawn from the tubuli as they seem to have been, intimating that they might have originally deflected, at the very opening of the tubuli, laterally upon the surface of the pulp, as Dr. Cutler states they were deflected when he saw them. Boll believes that nerve fibres exist in the dentine, and this is the doctrine held by many who are nevertheless very well aware that their existence in the tubuli has not yet been absolutely proved. In view of these extravagant claims set up by many American microscopists, both as regards the rights of

others as discoverers and as to *demonstrations*, when the facts only warrant a claim of probability, it is not strange that these so-called *discoveries* are held by careful and observing men to be entirely worthless, and consequently they do not find their way into any of the European journals.

We fervently hope that this incubus upon the respectability of the profession in this country will be thrown off, and that a public opinion, which shall have become wiser through an appreciation of the fallacies and errors of the past, shall dictate a dental literature that shall challenge the respect of the savans of other lands; especially as the excellence of American dental operative manipulations has won high encomiums from operators throughout the civilized world.

The next article in the *Times*, is by Dr. Buckingham, upon the reduction of scraps and filings to plate. We cannot give all that is essential in this article, in a short condensed extract, so we will content ourself with a very short extract from the article, but upon a somewhat different subject, which it seems to us might be often turned to practical advantage: "Silver wire dipped in nitric acid forms nitrate of silver on the surface of the wire, and the caustic may be applied, in this way, to the gums, to the pulp of a tooth, or into an alveolar abscess, more easily than it can from a solid stick of caustic."

In Dr. Wildman's "Odds and Ends," we find that gummed corundum wheels may be restored to their former condition by soaking them ten minutes in a very strong solution of caustic potash or soda.

Among the selections in the *Times*, we find another article taken from the *Register*, by Dr. S. P. Cutler, which is a criticism upon an article which appeared in the *Missouri Journal* in May last. The article criticised was written by a student of the Missouri Dental College, belonging to the class of 1869-70, and entitled, "Are the Mineral Acids Formed in the Mouth." We presume we shall hear from the author of the article again upon that subject. J.

From the "Canada Journal of Dental Science."

QUICK METHOD OF MAKING DIES.

By J. A. Troutman, Toronto.

I first take an impression of the mouth and make a model the same as for vulcanite, then take a flask (the same as is used for vulcanite) and drill three or four holes through the bottom; fill the lower part of the flask partially with sand, a little damp; put some sand on the inside of the model, and press or drive the model firmly into the flask, then press the sand around the outside of the model, not allowing it to come up any further than the impression did; brush around the model, and insert a sharp instrument through the holes in the bottom of the flask to allow the steam to pass out, then lift out the model and replace any sand that might be removed by the drawing of the model, then set the upper part or ring of the model firmly to its place and pour in the metal and allow it to cool. Then remove the ring, take out the model, attend to any defects that may arise from pouring the metal, set the cast on a bench, model upward, pin a slip of thick brown paper around the cast, pour the lead inside of the paper (the paper is strong enough to hold the lead without the support of sand), remove the paper, and the cast and die are complete.

By this method the most difficult casts can be made with the use of about a handful of sand, and with much less labor than by the ordinary method.

From the "Canada Journal of Dental Science."

BORAX.

By W. E. Hughes, L. D. S., Aylmer.

Thinking that the experiment I have made with this substance may be of use to the profession in general, I proceed to give the

following new use to which it may be put, and, I think, with advantage. It is well worth a trial, and will not cost much to try, and the way I accidentally stumbled on it was this. I had read that borax applied to plaster made it very hard, and one day I was using a boiling-hot solution, about half an ounce to a pint of water, when I immersed the model therein and immediately withdrew, and proceeded as usual to put on the teeth. After vulcanizing the plate in the usual manner, and when the flask was cold, I pried it apart and was agreeably surprised at the result. Scarcely a particle of the plaster adhered to the plate; that is, on the upper surface. I therefore have arrived at the conclusion that this simple process will answer instead of liquid silex, collodion, tin foil, or any of the ætherel solutions sold for the purpose of covering the model. The solution should be used boiling hot, allowing the model to remain in only two or three seconds. The same solution may be used a number of times. It is well worth a trial, and, if found as useful as my experiments have proved it to my satisfaction, I shall feel glad in knowing that some good may rise from the accidentally finding out this simple process. Whether or not any particular chemical action takes place, I am not prepared to say, or even to give any reason why, for the above cause. I leave this to any person to study out who wishes. I merely give the facts of the case as I find it.

From the New Orleans "Daily Picayune."

OBITUARY.

Knapp.—Suddenly, on Wednesday, February 15, 1871, Mrs. Emily A., wife of Dr. J. S. Knapp, aged 44 years. Dr. B. M. Palmer officiated at the funeral ceremony, which took place in the afternoon of the day of her death, at the residence of the family.

IN MEMORIAM.

New Orleans, Feb. 15, 1871.

At a special meeting of the New Orleans Dental Association,

held this day, at the residence of Dr. J. A. DeHart, the following preamble and resolutions were unanimously adopted.

WHEREAS, It has pleased Divine Providence to take from a prominent member of our association, his beloved wife, and we desire to offer our condolence and sympathy to those who are most bereaved,

Be it Resolved, That in the sudden and untimely death of Mrs. JAS. S. KNAPP, her husband, children, relatives and friends have suffered a deep affliction and an irreparable loss;

Resolved, That the many excellent qualities of mind and heart exhibited by the deceased, are most worthy of emulation, and by her exalted virtues, social and urbane manners had won the highest esteem of all who knew her;

Resolved, That these resolutions be spread upon the minutes of this Association, that they be published in the city papers, and that a copy of the same be handed to the family of the deceased. JOHN G. ANGELL, D. D. S., Pres.

A. F. MCLAIN, D. D. S., M. D., Rec. Sec'y.

NOTICES.

The Charleston Dental Association meets 2d Tuesday of each month. President, Theodore F. Chupein; Vice-President, Geo. H. Winkler; Secretary and Treasurer, B. A. Muckenfuss.

The South Carolina State Dental Association meets in Charleston, South Carolina, in April, 1871. President, J. B. Patrick; Corresponding Secretary, Theo. T. More; Recording Secretary, O. J. Bond; Treasurer, Theodore F. Chupein.

PROXYLINE.—This new base is now being tested in this city, and thus far with favorable results. We hope to give our readers a report of some cases in our next issue. Any one wishing to try it can obtain personal or printed instructions, and the necessary apparatus and material by application in person, or by letter to W. H. Morgan, Missouri Dental College Infirmary.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] MARCH, 1871. [No. 3.

HISTORY AND PROGRESS OF DENTAL SCIENCE.

Valedictory Address, Delivered at the First Commencement of the Missouri Dental College, by H. JUDD, M. D., Professor of the Institutes of Dental Science, February 22, 1867.

History has dealt kindly by the arts and sciences by throwing around their infancy a veil of mystery. It has taken from the hand of fable and tradition a few scattered elements of fancy and woven them into semblances of august, pleasing or imposing realities. Æsculapius, represented as the fountain head of medical science, presents to the mind of the inquirer, an object august and full of interest. The myths that have been appropriated by the legal historian, which describe the origin and growth of legal codes when individuals first formed themselves into clans, and these spread into tribes, and widened into nations, were sufficiently probable to accomplish the designs of the historic writer by clothing these earliest records with the pleasing garments of simplicity. The historian, so far as theological science is concerned, has no need of mythical personifications to gild the cradle of its infancy, for revelation has appropriated to itself the task of illuminating these prehistoric mysteries, and ushers in its origin with the most imposing solemnities. Those who pride themselves upon the antiquity of the art or science to which they have dedicated their lives are apt to deceive themselves with the idea that to be antique is to be ennobled, and that

antiquity and nobility are synonymous terms; but it is highly probable that a correct history of the origin of medical, legal or theological investigations would disabuse their minds of so flattering an illusion. The great truths of science have, as a general thing, not come down to us from these dark periods in the world's history. Its broad foundations were not laid in a single day, and a structure reared thereon sufficiently imposing to immortalize its founders and ennoble all of its succeeding votaries; but the profound darkness of the olden time has been broken in upon and dispersed little by little, a single ray of light first forcing its way through the surrounding gloom, and thus making way for another, and another, until these truths of science have become manifest through the struggling energies of ages. Fortunately for professional men, the respectability of an art or science at this age of the world does not rest upon the mythic glories of its earlier days; for were this the case, a few rays of light thrown upon these dark pages of their history might yet drag them from their honored pedestals, and place them side by side with arts and callings, which though now less esteemed, can boast of as high an antiquity and a no more plebeian origin than their own. Surgery was for a long time considered as belonging to the province of the general practitioner of medicine, and many surgical operations of great importance are recorded that were performed by the distinguished physicians of the Hippocratic and Galenic eras. This condition of things was not disturbed until about the beginning of the thirteenth century, when the practice of physic fell for the most part into the hands of the ecclesiastics of the Roman Church, who were forbidden by the canons of their church to draw blood. To pursue the practice of surgery, and at the same time to conform to their canonical laws being impossible, the practice was almost entirely abandoned by the only class of men who were in any degree fitted for the performance of surgical operations. At this time and before this period, the barbers had occasionally performed minor surgical operations, and being the only class who made any pretensions to surgical knowledge, they easily appropriated to themselves nearly the entire surgical practice, so that barber and

surgeon soon became synonymous terms, and finally the title of barber-surgeon was appropriated by this illiterate, mongrel profession. The position which these surgical practitioners occupied in society at this time may be inferred from the fact, that it was unlawful for any artisan to take a young man as an apprentice without his first making oath that he belonged to a respectable family, and particularly to one in which there were neither barbers, bath keepers, nor butchers. During the thirteenth century a few of the clerical practitioners ventured to perform some surgical operations, and the number gradually increased in the fourteenth century in spite of the prohibitions of their canonical laws; but these practitioners were discountenanced by the great body of the profession, who had by this time learned to look down upon the practice of surgery, regarding it as an ignoble art. These ecclesiastical surgeons, therefore, occupied at this time an intermediate position, between the barber-surgeons on the one hand, and the medical fraternity on the other. They refused to be associated with the former, and were not recognized as honorable practitioners by the latter, and in consequence, were excluded from the honors and emoluments that were extended to the medical profession. A few of this class finally formed a collegiate association among themselves, at St. Come, in France, for the purpose of facilitating the study of surgery, and after many struggles and vicissitudes, with the barber-surgeons on the one hand, and the medical fraternity on the other, they were finally allowed the privilege of entering themselves as scholars in the University of Medicine, in France, and were acknowledged from that time as members of the medical profession. This occurred about the beginning of the sixteenth century, and up to this time the history of general surgery was the history of dentistry; for although the dim records of an antiquity coeval with the youth of Memphis and the maturity of Thebes, hint at special physicians for the teeth, and the poets who sung whilst Troy was battling with the Grecian hosts speak of artificial dental substitutes, still, nothing has come down to us in these mythic records sufficiently definite to warrant the belief, that the study of dentistry had ever been pursued apart from the study of general

surgery. Early in the sixteenth century, Ambrose Parè wrote his celebrated treatise upon the teeth, which had the effect of directing the attention of medical men to these important organs. But few advances were made, however, in this direction until the seventeenth century, when dentistry began to assume the proportions and characteristics of a separate branch of medical science. During this century appeared the celebrated treatises of Bichât and John Hunter, who seemed to fully appreciate the sympathies and connections of the teeth with the entire framework of man. During the eighteenth century, the operative and mechanical departments were steadily improving, but it remained for the active and energetic workers of the present century to collect and arrange the facts that had been brought out by individual enterprise in such manner as to form a connected system. At this time, theorists, operators, and experimenters arose in quick succession, among whom, as yet, the French led the way in advance of all competitors. But the English soon entered the arena and carried on a spirited contest for the supremacy. The first dentist upon this continent was probably LeMair, who came over from France, and shortly afterwards Whitlock arrived from England; the one commencing practice in New York, the other in Philadelphia, during the last quarter of the eighteenth century.

John Greenwood was the first native American dentist who commenced practicing in New York, in 1788. The numbers of the profession increased rapidly in this country, and in 1839 was issued the first number of the American Journal and Library of Dental Science, which being conducted with energy and ability, seemed to rouse into action the energies of the whole dental fraternity; and a necessary consequence of this activity in the members of the profession was the formation of the design of a dental college, where the student of dentistry might command all the advantages whilst fitting himself for the practice of his specialty that the surgeon or the general practitioner enjoyed in the colleges of medicine or surgery. The conception of the design was followed in 1840 by the execution of it, and under a charter of the State of Maryland, the Baltimore College of Dental Sur-

gery was brought into existence, and took its stand among the literary and scientific institutions of the land, as the first regularly organized dental college the world had ever known. Dentists will ever look back with interest upon this eventful epoch, in which dental art burst its chrysalid form and stood revealed a living science. It was not born surrounded by the mysticism, the superstition, and the darkness of the world's early history, but came into existence in the fullness of the mid-day light of the nineteenth century. Untrammeled by the weight of hoary theories, and unfettered by the prejudices engendered by acrimonious disputations, it was fitted to appropriate to its own use whatever of art or science it found ready developed to minister to its necessities, and without stopping to mingle with the disputants of opposing dogmas, set itself vigorously to work in the direction of scientific progress.

Other colleges of dentistry have been instituted. Associations of dentists have been formed for mutual improvement, both in the old and new world, and some of the most interesting histological and physiological questions of modern times have been cleared up by the labors of dental investigators. If Clopton Havers has succeeded in engraving his name upon every vascular canal in the osseous structures of the animal creation, by writing a description of the Haversian systems, Tomes is entitled to as undying a distinction for his successful investigations upon the dentinal tubuli, establishing their tubularity, making out their contents, and demonstrating their physiological actions and their pathological anatomy. It is not to the investigation of the teeth alone that Tomes has devoted his attention, but as a writer upon general histology he stands to-day second to no living man, as the constant reference to his works by other writers on histology abundantly demonstrates. That there may be a still more rapid advancement in scientific attainments in the profession, arises the necessity for a more extended course of dental studies, and a more intimate knowledge of the fundamental principles of medicine, that all the sympathies, and physiological and pathological connections of the different organs of this wondrous work of nature may be fully appreciated and

understood. The attention can scarcely dwell for a moment upon this proposition without the grand truth forcing itself upon the mind, that to be able to treat successfully and safely the various pathological conditions of the teeth and oral cavity, requires the same amount of general knowledge of medicine that is necessary for the success of the oculist, the aurist, the surgeon, or the practitioner of general medicine. There is no necessity for argument to prove this proposition, for the common sense of any intelligent community can not fail to perceive its axiomatic character as soon as the proposition is fairly and fully stated. In view of these facts, the practitioners of the West conceived the idea of establishing an institution of learning for dental students, where the fundamental principles of medical science should be recognized to the fullest extent, as the only proper foundation for a knowledge of scientific dentistry. As anatomy, physiology, materia medica, and chemistry were justly considered as the proper foundation of medicine, it only remained to determine the best method of enabling students to attain a knowledge of these branches, as well as to provide a thorough course of instruction in all the practical details of the art. If it should be conceded that a knowledge of Latin or Greek were one of the requisites of a respectable medical education, no one would suppose it to be necessary to establish a chair of languages in every medical institution; because our numerous literary institutions present every advantage that could be desired to those students who wish to make themselves masters of these languages; and such institutions would undoubtedly be the proper place to attain this part of their education.

If we should concede, again, that a knowledge of English grammar were desirable for the student of medicine, or if it were deemed necessary to discipline the mind by a course of instruction in geometry or mental philosophy, it would scarcely be thought necessary to establish separate chairs in all our medical colleges to teach these branches, however important it might be that this knowledge should form a part of the education of medical men. Our common schools, seminaries, and literary colleges present all the advantages that experience, learning,

and devotion to the cause have been able to devise for imparting a knowledge of these branches, and such are undoubtedly the proper institutions to impart this instruction. If, then, it be necessary for dental students to acquire a knowledge of the fundamental principles of medicine, it is manifestly proper that they should receive this necessary instruction in those honored seats of learning where these studies have been taught for centuries, and which it is universally admitted afford greater facilities for this kind of instruction than can be elsewhere enjoyed. The proper place for instruction in a medical college to commence, is where the course necessarily diverges from that pursued in acquiring a general literary education, and the proper place for the special functions of the dental instructor to begin, is when the specialty diverges from the course of general medicine, and enters upon the theoretical and practical details of the science. To take upon itself more than this, would subject the institution to the same burdens that a medical college would be subjected to if it should attempt to take upon itself the task of teaching every branch of learning that was essential or useful to the well-informed medical practitioner. The experience of the few dental colleges which have existed for any considerable length of time, fully sustains, in my judgment, the foregoing theory. By attempting to teach those branches that can be much better taught in the medical colleges of the country, they have laid a burden upon themselves which nothing but the indomitable energy and perseverance of individual enterprise has enabled them to sustain, and the fact, that is everywhere patent, that their students have not as a general thing, been as proficient in these medical branches as the students of medicine who have spent the same time upon these studies in medical colleges, furnishes but poor encouragement for persisting in a mode of instruction that has to a great extent failed to accomplish the desired results. Recognizing these facts, and being aware of the defects that had hitherto attached to dental teaching, the founders of the Missouri Dental College determined that this *opprobrium chirurgiæ dentium* should no longer have cause to exist. This has been effectually accomplished, so far as the

organization of this institution is concerned, by an arrangement effected with the St. Louis Medical College, through which the medical and dental student pursues these common branches side by side, the same advantages being extended to the one as to the other, and the same proficiency required of the one as of the other, that they may be entitled to the honors of their respective institutions. Taking into consideration the history of the dental art, the obstacles that it has overcome, and the disadvantages under which it has labored, it has accomplished much more in the way of progress than could have been reasonably expected in so short a time. In the brief period since it first sprung into existence as a distinct branch of medicine, six dental colleges have already been established in the United States, whilst no other medical specialty can boast of a single institution of learning dedicated to its own use, and supported and fostered by the enterprise, energy, and progressive spirit of its own members. If the infancy of dentistry was somewhat clouded by ignorance, its youth has already done much to dispel the darkness that brooded over it, and all the energies of the profession are to-day directed to the accomplishment of the grand desideratum of placing it, so far as intelligence, literary acquirements, and scientific attainments are concerned, upon an equality with the other learned professions of the land. To the accomplishment of this end other influences are at work, which are no less potent than the determination, devotion, and energy of the members of the profession themselves, and chief among these is the imperative demand which is constantly being made by educated, enlightened and refined communities for the greatest possible degree of excellence in dental operations. Persons in every grade of society desire immunity from pain and suffering, and in the most common and painful of all the maladies that afflict mankind they all look to the dentist for relief. The lower classes have, as a general thing, been willing to sacrifice the offending members for the sake of present ease, though their whole after lives were subjected to inconvenience for the loss. The more intelligent part of the community have submitted to these losses of important organs with greater reluctance, which was increased

by their appreciation of the inconveniences thereby entailed upon them for life, and the danger incurred by the deleterious influences exerted thereby upon the general health, and perhaps still more influenced by the sad reflection that one of the organs that had hitherto formed a part of themselves, and had to this time performed the function assigned it by the Great Designer, had been lost to them forever. All improvements in dental practice, which have looked to a more extended conservatism of dental organs, are being more and more appreciated, and the immense advance made by the profession in the last few years towards a universal conservation has already been the source of many blessings, and is destined hereafter to exert no feeble influence in promoting and preserving the general health of communities, and thereby contributing to the general weal of man. But these strictly utilitarian considerations are not the only ones that are brought to bear to stimulate to new exertions in this direction. The human face is an index of marvelous accuracy, which marks upon its surface various phases of thought and feeling, and is lighted up or clouded by every sensational emotion. Physical changes, in the way principally of muscular contractions, engendered by these emotional causes, give rise to an ever-changing variety of facial expression, and in these expressions exist, to a very great extent, those mystic influences which, though they can not be described in words, we are all constrained to feel. Here rests the source of a wondrous power; a power that has lighted up wars and dictated terms of peace; a power that has controlled emperors and led captive, kings; a power that has overturned states and annihilated empires. These perfect models of the "Great Artist" are unfortunately liable to the ravages of disease, and if abandoned to its destructive power, one after another of their attractive features disappears, and what was once an object of loveliness and admiration, is transformed and deformed, until only a wreck remains, bereft of its regal power, and despoiled of its queenly beauty.

These destructive changes are to a great extent due to diseases of the organs of the oral cavity, and a thousand hands are outstretched and a thousand voices raised, calling upon the dental

profession to preserve these priceless forms and features from the ravages of such remorseless maladies. Can there be more powerful incentives to energetic and continued effort directed to improvement in dental practice? From these considerations, it will not be difficult to divine the future of the dental art. The demands of its patrons will be fully met. Whatever science and art combined can do, will be done, and the importance and usefulness of the profession will be universally acknowledged.

To you, gentlemen, as alumni of the Missouri Dental College, we look with confidence for noble efforts in this behalf, and from our knowledge of your devotion to the cause of science, your untiring energy and perseverance, and your proficiency in all the acquirements that go to make up the dental investigator and practitioner, we feel that our confidence has not been misplaced.

From the London "Microscopical Journal."

SO-CALLED "SPONTANEOUS GENERATION."

Abstract of a Paper read at a Meeting of the Quekett Club, on the 23d of September, 1870. By Benjamin T. Lowne, M. R. C. S. Eng., &c.

When I announced a month ago that I would read you a paper on "Spontaneous Generation," I had no idea that one of the greatest living naturalists was going to give a most able *résumé* on the subject, or perhaps I should have hesitated in coming before you. Nevertheless I feel it is a matter for congratulation that I did so, as many unanswered questions have arisen since Professor Huxley delivered his able address at Liverpool.

Two hundred and two years ago Francesco Redi successfully combated the then prevalent doctrine of spontaneous generation by the most simple, nay, almost childlike experiments, such as putting meat under fine guaze, and so showing that maggots are

not spontaneously generated. Since that day the tendency of experiments has certainly been in favor of Redi's aphorism, "Omne vivum e vivo."

The question, however, all turns upon that little word *omne*, all; whether *all* living things originate from germs, or whether some may originate spontaneously from not living matter.

Now, there can be no doubt but that there was a first cell in a first organism which had no progenitor. Professor Huxley said last week, that although he could not believe anything in the absence of evidence upon the subject, that "expectation is permissible where belief is not;" and that if it were given him "to look beyond the abyss of geologically recorded time to the still more remote period when the earth was passing through physical and chemical conditions, which it can no more see again than a man can recall his infancy; he "should expect to be a witness of the evolution of living protoplasm from not living matter."

To show you that I am not biassed in this matter, and that I am no partisan, I tell you I go farther in my expectation than Professor Huxley, and I think that if we could produce the conditions, we might see amœbiform protoplasm originating even yet from inorganic matter. Perhaps, as Dr. Bastian suggests, colloid may be intermediate between inorganic and organic living material, but I tell you, gentlemen, this is all expectation, and should not be belief, as we have not at present a tittle of evidence in its favor. No doubt, with Mr. Charles Darwin's hypothesis, the origin of living organic matter from inorganic matter would supply a gap in the evolution of the animal kingdom, but we must not on that account found a scientific belief.

Now, gentlemen, I shall very carefully sift the supposed evidence in favor of spontaneous generation; I shall divide this evidence into that which is purely microscopic and that which is dependent on experiment.

First, with regard to the microscopic evidence, it consists in the assertion that some observers have seen organic living cells and fungus spores built up by the aggregation of minute granules. Now, there is very strong evidence on the other hand

that this does not happen; the organisms described as fungus spores are in some cases not fungus spores at all, and in other cases they have been observed with a hilum or point at which they were attached to a parent. Surely, gentlemen, we cannot believe this point of attachment was the character of a spore formed *de novo*.

On the other hand, I should be sorry to deny, with my present knowledge, that it is possible organism of a simpler kind, such as unicellular organisms, may be built up in this way. If such a mode of evolution does take place, I still believe it is from pre-existing germs; such gemmules, for instance, as Mr. Darwin believes in, in his beautiful provisional hypothesis of pangenesis. I believe, if it can be proved that organisms can be produced by aggregation, it will be found that this only takes place when pre-existing cells have given up their contents in the fluid experimented on.

With regard to the experimental evidence, it has been arrived at from two classes of experiments.

The first aims at the production of known organic forms from solution of animal or vegetable matter, the second aims at the production of new and unknown forms under new conditions in saline solutions.

I shall consider these two sets of experiments separately.

In the first, or simplest set of experiments, the most contradictory evidence has been arrived at by different observers. The whole, to my mind, may, however, be summed up in the following.

If we receive the usually accepted belief that the boiling temperature destroys germs, we must accept spontaneous generation as a fact. If, on the other hand, we believe that germs are not killed in this manner, these experiments only show that if the greatest possible care is used, germs may not be admitted and a negative result may be arrived at, and yet that germs may find their way into the flasks of the most careful experimenter, and may afterwards germinate.

Now, gentlemen, I have instituted a series of the most careful experiments, which have shown conclusively to my mind that germs are not destroyed by the boiling temperature.

I took a neutral solution of acetate of ammonia and put into it a number of spores of the little mould known as *Penicillium glaucum*, and boiled them well. I then enclosed some of the boiled fluid and germs in capillary glass tubes, like those used for preserving vaccine lymph. I then carefully examined the tubes by scrutinizing them with the microscope for an hour each, and not a spore had germinated, not a mycelial filament existed in the tubes. I then put the tubes into a warm place by the stove, and in twenty-four hours numerous mycelial filaments of considerable length had protruded from many of the spores. Now, gentlemen, I should think the most hardy advocate of spontaneous generation would hardly assert that these spores had originated *de novo*, and germinated in a single night and day.

To make the experiment more complete, I enclosed in another tube some spores which had not been boiled, and I found about the same number had germinated in this tube as in those containing the boiled spores.

I have tried another set of experiments of a similar kind. I boiled a vegetable infusion containing a quantity of the bead-like growing mycelium of some fungus, probably a state of *Penicillium*, and mounted a few portions in a cell for the microscope. I then carefully examined and drew these portions, and watched them from hour to hour, and saw new cells formed and new buds put out. I have done this again and again with the same result.

I have further found that this process is arrested in sealed tubes after a few hours; I cannot tell why, but I strongly suspect from the absence of dissolved air in the fluids: Mr. Cooke has suggested it may possibly be from absence of dissolved nitrogen. I strongly suspect it is from this fact that we are able to preserve meats, etc., *in vacuo*.

Of this at least there can be no doubt, both the growing mycelium and the spores of the common blue mould, *Penicillium glaucum*, will grow after boiling, and it is nevertheless possible to preserve meat, &c., on a large scale, by enclosing it *in vacuo* after boiling it.

I may here remark that Dr. Bastian's eighth experiment, in which he found that an infusion of turnip decomposed more rapidly when enclosed *in vacuo* than a similar solution enclosed in a flask containing air, is simply incomprehensible, and is a contradiction to the well known process of preserving meats, vegetables, fish, &c.

I think, gentlemen, very few will believe we are justified, *without evidence*, in believing a temperature somewhat higher will kill these spores if boiling does not. I therefore look upon it that if a few observers will repeat my very simple experiments, no evidence will be afforded by such experiments as those I have included under this first division in favor of generation *de novo*.

The second series of experiments which aim at the production of new and unknown organisms, afford a wider field for speculation. I must confess, however, that in every case which I have seen, these so-called new organisms have appeared to me undoubtedly foreign bodies, which have accidentally gained access to the solutions.

The most recent experiments of this kind were carried out by Dr. Bastian, and their results have been published in 'Nature.' In these experiments a solution of sodic-phosphate and ammoniac carbonate was enclosed *in vacuo* whilst boiling, and certain spiral fibres and portions of a fungus, like penicillium in fruit, were found after a time in the solutions.

With a view to discover whether the spore-bearing portions of *Penicillium* would stand boiling, I tried the unripe spore-bearing filaments, and found that they were not altered in their appearance by such treatment. The ripe spores are, however, immediately scattered by contact with fluid. Now I can readily understand why these fungi were not discovered until after a long lapse of time: I find solutions of sodic-phosphate throw down a flocculent precipitate after a time, and in those specimens which Dr. Bastian was courteous enough to show me, I observed that the object was surrounded by just such a precipitate, which he called correctly enough granular matter. I suspect the collection of such a flocculus around the fungus drew his attention to the spot where the minute mass of fungus was.

Another reason for not believing that the fruit-bearing stems of *Penicillium*, which Dr. Bastian figures, were formed in the solutions, is that these fungi never fructify in fluid. My friend, Mr. M. C. Cooke, tells me that he never heard of any fungi, except such as are parasites on insects, fructifying in fluid, or so long as a plentiful supply of fluid is present. As he very forcibly put it, take the vinegar plant as an example; so long as there is plenty of fluid, it never produces fruit; but take it out of the fluid and its surface will soon be covered with blue mould. With regard to the so-called spiral fibre organisms of Dr. Bastian, they have puzzled me very much. I never, however, believed but that they were some very common accidental material which had found its way into his solutions.

I observed that he only found these "organisms" in solutions containing sodic phosphate. I have tested and had tested for me three samples of crystals of this salt, and in all free soda was present. I have since tried the action of very dilute solutions of caustic alkali on various kinds of organic fibre, and have found wool fibres, minute particles of feathers, and some kinds of spiders' thread twist into spirals under its influence. Now, the spirals produced from spider's silk correspond most closely with Dr. Bastian's spiral fibre. In my own mind I have no doubt the specimen he kindly showed me was spider's silk.

At any rate, gentlemen, I do not think in the face of this we ought to conclude that we have discovered spontaneous evolution from the appearance of spirals in an alkaline solution.

I apprehend then, sir, from what I have said, if my experiments are confirmed, which can easily be done, that at present, let our "philosophic faith be what it may," we have no evidence whatever of spontaneous evolution.

A discussion followed entirely in favor of Mr. Lowne's views on the insufficiency or absence of any evidence in favor of spontaneous generation, in which the President, Mr. M. C. Cooke, and others took part. The President, having left the chair for the purpose, also spoke at some length upon the subject, demonstrating with great clearness several important errors into which

Dr. Bastian must have fallen, and disposing in a masterly manner of a number of arguments advanced and relied upon by the advocates of spontaneous generation. The results of some experiments by Dr. Child, which were made at the laboratory of the University of Oxford during the previous week, in repetition of those of Dr. Bastian, were communicated to the meeting, and the question was declared to resolve itself merely into one of the exclusion of germs. A number of other points of great interest, as bearing upon the general subject, were touched upon by the speaker, who was listened to throughout with the greatest attention, and resumed his seat amidst great applause.

From "The Pharmacist."

ON FERMENTATION.

By Prof. A. W. Williamson, F. R S.—Before the Society of Arts.—Reprinted from the Pharmaceutical Journal, London.

Lecture I.

I have sometimes wished, when building castles in the air, that I could, after a few hundred years, come back and see the state of science at that time. I am convinced that those who will look back, from such a period as a few hundred years hence, at the present state of our knowledge of nature, in any one department, will be surprised at its smallness; in fact, even now, when we work at all earnestly at any one part of the field of nature, we cannot refrain from feeling how little is our knowledge compared with our ignorance. But, if that is generally the case, I think it is peculiarly the case in those studies in which life is concerned; and the phenomena of fermentation have that peculiarity that they consist of processes in which vital organisms are concerned, and in which there is every reason to believe that vital organisms, or living beings, take an active and leading part. I need

not say that, for that reason, the explanations which we have, even of the simplest and best known of the phenomena of fermentation, are, as yet, mere sketches of the reality. It is however, not the less useful or the less important to know them for that reason.

When we chemists are classifying substances, we adopt a principle of classification which I think is almost inevitable, but it may be as well that I should mention what it is. We put the simple things together, and the complex or difficult things together, and then we try to put between them, in as regular an order as possible, the intermediate links of the chain by which they can be connected; and I believe that our best — I might almost say our only — explanations consist in thus arranging, in a natural order, the facts which we have to consider, and then, viewing them, and stating what we see, in the clearest and least ambiguous terms. Now, the term "organic," as applied to a certain class of chemical substances, might be replaced — and I think, for some purposes, ought to be replaced — by the term "complex." The substances which we are in the habit of including under the term organic are peculiarly complex; in fact, they are the most complex with which we have to do. The phenomena of fermentation relate mainly to them, and consist principally of a process of change,— the breaking up of those organic bodies into rather less complex substances than themselves,— a process of partial analysis. Of course, when I say that, I give what I conceive to be a characteristic idea of the general method, and I must not be supposed to assert that all processes of fermentation are analytical.

Amongst the characteristics which, I think, are particularly useful and interesting, as serving to distinguish organic from inorganic, complex from simple substances, is their different behavior under heat. I have found it exceedingly interesting and instructive to bear in mind the fact that while simple and inorganic compounds, as we generally call them, are sometimes destroyed and resolved into other compounds by the action of a high temperature, yet many of them are not. Amongst inorganic substances we find some which are broken up or changed

by exposure to a high temperature, but there are others which can stand even the highest temperature without undergoing any permanent change, that is to say, they return, on cooling, to the same state in which they were before the heat was applied. With organic substances that is not the case. All organic bodies are broken up into minute particles, and assume new arrangements, when they are heated to a sufficiently high temperature; and that is, I think, a distinction which is of considerable theoretical as well as perhaps of some practical importance.

The processes of breaking up which are effected by heat upon organic bodies are, in the very great majority of cases, different from those which are effected by the action of these wonderful little organisms, the ferments; and it is a peculiarity of the action of the ferments that they effect the breaking up—the analysis—of complex organic substances, and form products which, for the most part, we have obtained from those materials by no other process.

Amongst the processes of fermentation, there is one which, from its pre-eminent importance, and from the fact that we have had occasion to study it more fully than any other, ought to be first mentioned. I allude to the process of fermentation by which alcohol is formed artificially. I may say, indeed, it is the only process by which alcohol is ever made. It is a process which consists in breaking up some kind of sugar, for sugar is a word which, although popularly restricted to one particular substance, which is extracted sometimes from sugar-cane and sometimes from beet-root, is used by chemists in a more general sense, serving to characterize a family of bodies which have much in common with one another, being for the most part all of them sweet, and containing the same elements, but in slightly different proportions. They all possess many properties which are of some importance. These different kinds of sugar are broken up by the action of ferment into alcohol, and also into another product, carbonic acid gas, which has been long known, and for a long time the process of alcoholic fermentation was supposed to consist simply in a separation of sugar into these two products, alcohol on the one hand and carbonic acid on the other. A more

careful examination of the products has shown, however, that these two never appear alone. I believe I may safely say, from the researches of Pasteur and others, that no case of the formation of alcohol by fermentation has been known to occur in which several other products have not been formed simultaneously with these two. With regard to the difference of properties of these two bodies, there are one or two points of some little interest, especially this one, that whereas alcohol is an eminently combustible substance, and is well known to have properties of that kind, being frequently used as fuel, on the other hand, carbonic acid, the other chief product, is completely burnt; it is a substance incapable of undergoing any chemical change whatever analogous to combustion. Alcohol is a substance which I need not show you, although in its pure state it is not very common; but I will, in order to remind those of you who may be less familiar with its properties, make a little carbonic acid by a short process. I will put a little muriatic acid upon some white marble, and the apparent ebullition which you see take place is known to you all as due to the liberation of carbonic acid. You might imagine the thing to be fermenting, only that the process in that case would be less rapid. Now, if I plunge this little burning paper gradually into the jar containing the carbonic acid, it will burn more and more faintly, and get extinguished when it enters the gas; it is totally impossible to set fire to the gas. And there is one other fact we may notice at the same time — the great specific gravity which characterizes this gas. I will show you that, in this way. I will go through the motion of pouring from this jar containing it into another smaller jar, and no doubt the heavy carbonic acid will pass from the jar in which I first collected it into the lower one, where we shall find it by means of the taper as before. You see that, on lowering the lighted taper into this small jar it is extinguished as it was before. I will show you the test by which we usually discover the presence of carbonic acid. I have here some water containing lime in solution,— some lime-water,—and I will pour it into the large beaker-glass, in which there is probably still some carbonic acid left. You see the solution immediately becomes turbid, or, as we express it, a precipitate is

formed by the combination of the carbonic acid with the lime-water. A compound is formed, which is nearly insoluble in the water, called carbonate, which goes down as a precipitate.

In addition to alcohol and carbonic acid, I ought to mention another kind of alcohol, which occurs to a considerable extent in some distilleries where raw grain or potato-starch is used. This substance imparts to the product a very unpleasant odor, and some unwholesome qualities. It is known by the name of fusel oil. It does not mix with water, and if I were to pour some of it on water it would float, without dissolving to any considerable extent. There are some other products which are even more interesting and important; two especially I ought to mention. One is the clear substance which you see in this bottle, and which you might imagine to be oil; it is a fluid largely made now, and known by the name of glycerine, but in chemical language I should say it was an alcohol. It is a substance which, by tasting, you might mistake for sugar, for it possesses a sweet taste, resembling sugar, but, to chemists, it is a kind of alcohol, and its appearance during fermentation, together with ordinary alcohol, is no doubt due to a process of the normal kind.

Another product which I might compare to the carbonic acid which I just now showed you, is this beautiful crystalline acid substance, which has been long known by the name of succinic acid. It got that name from the fact that it was originally prepared from amber. By subjecting the amber to dry distillation, succinic acid, among other products, is formed. Glycerine and succinic acid, as well as common alcohol and carbonic acid, are always formed when any kind of sugar is made to decompose by the process which is termed alcoholic fermentation; and it is seldom that there are not other — and probably, in smaller quantities, several other — products formed besides those four. In fact, the different kinds of spirit which are obtained by the process of fermentation and subsequent distillation, — I mean those kinds of spirit to which no artificial flavoring material is added (gin is a general name given to certain spirits which are flavored by artificial means), such as brandy, rum, and others,— owe their distinctive peculiarities to the presence of small quantities

of volatile substances which are formed during the process of fermentation, regarding which a good deal has been observed, and several important facts have been collected.

There is another process of fermentation which I must mention, for it is important from its frequent occurrence, and that is a process by which another kind of sugar usually, but sometimes common sugar, is transformed. The substance which most naturally undergoes this fermentation is milk-sugar. These hard lumps in this bottle, which, if you were to take out and taste, you would not imagine to be sugar, are made by the crystallization of the solid substance in whey. The whey is evaporated carefully to a small bulk, and this substance which results is known by the name of milk-sugar. When a solution of this is mixed with cheese, which is the best ferment for the purpose, it gradually turns acid. I dare say it is known to all of you that milk itself, which contains this body, and cheese, or rather caseine, dissolved with it, together with the fatty globules of milk, when exposed to air, turns acid. That acidity is due to a change which takes place in the sugar. The sugar disappears gradually, and is transformed into an acid substance of which I have a little bottle here. It is a strong acid, and here in another bottle are a few of its salts,—a lime salt and a zinc salt, which is a very beautiful and characteristic compound. I shall have occasion hereafter to show you a large bottle which is now at work, in which I dissolved, not this peculiar kind of sugar, but the ordinary sugar. I put with it a quantity of calcic carbonate, and some old, lean cheese, with a considerable quantity of water. The mixture was kept at a temperature above blood heat for some considerable time, and a compound of lactic acid is being formed. That is a process analogous in its general features to the fermentation which forms alcohol, but it is a change of sugar in which no alcohol is formed. Sometimes there is a trace of alcohol, but there is not necessarily any, and no carbonic acid is formed ; but instead of these products, the elements of the sugar break up into different groups, and arrange themselves in another manner. That is really the nature of the process, as far as our most careful experiments have gone, and the acid which we make

in that way, which is lactic acid, or acid of milk, is really sugar of which the elements are arranged in a different way, so as to acquire acid properties.

The third process, which I must mention from its remarkable products, is one which, perhaps, in some respects, ought rather to be compared with putrefaction, for it is a process which has many of the most important characteristics of putrefaction. In order to deal with the question of fermentation generally, it is necessary to allude to some varieties of such chemical changes which are usually classed under the term putrefaction. As a general rule, I think the characteristic of processes of putrefaction is mainly the unpleasant nature of the products which are formed. It is not long since a distinguished chemist, in speaking of alcoholic fermentation, said it is really a putrefactive process; and in its intimate nature it is, as far as we know, a process much like the truly putrefactive processes, and different from the processes of eremacausis or oxidation. This other process to which I allude consists of forming the acid substance which I have here, and which I will not open, because it is not a very pleasant body. It is a substance which is known, although I believe not very commonly, in butter. The peculiar rancid odor which butter acquires when it is kept too long, especially in warm weather, is due to a transformation of some of its materials into this particular acid, which Chevreul, a very distinguished French chemist, separated from butter, and he named it from that circumstance butyric acid. If we leave some of this product of the last fermentation,—some of this lactate of lime, the lime salt of lactic acid,— under the same conditions in which it was formed, that is, if we leave it in the same vessel in which it had been formed from milk or sugar, and leave cheese with it, and keep the mixture warm, the lactate will gradually decompose, and carbonic acid will be given off together with hydrogen gas, and at the same time we find that the lactic acid will be decomposed, and in place of it we get this butyric acid, and generally some valerianic acid and a little acetic acid.

Amongst the processes which really are analogous to fermentation in their nature, but which differ in one particular, I must

mention one other, the process of forming vinegar, or acetic acid. This large bottle contains vinegar in a form which most of you, I dare say, have not seen. These fine white crystals are the pure substance which, mixed with water, in an improper state, are generally known by the trivial name of vinegar. We call that acetic acid, or hydric acetate. The formation of this body from alcohol represents a variety of fermentation which is of considerable importance and of frequent occurrence. Everybody who has noticed the process which takes place when animal or vegetable matter is left to itself in contact with air, especially in moist localities, must have observed that there is a gradual disappearance of the organic matter. For instance, if you leave a piece of wood in a moist place, under certain conditions of very frequent occurrence which are favorable to this process, the wood gradually gets soft, and becomes transformed into a brown substance, and if you leave it long enough—in this country, several years generally would be needed for this purpose—it gradually disappears. If you were to put a piece of that decomposing wood into a closed glass vessel, and examine the air above it, you would find that the wood was really burning. I am using the word combustion in the ordinary chemical sense—I mean by that word that the oxygen of the air which you have enclosed with the wood is being taken up by the wood, and the products of combustion, carbonic acid and water, are being formed from the substance of the wood. One great class of the processes of fermentation is of that kind. They consist not in a mere breaking up of the materials already contained in the organic substance, but a change of their arrangements, which is due, more or less, to the absorption of oxygen, and this formation of acetic acid or vinegar is a case of that kind. In fact, if we were to leave some ordinary fermented wort in an open vessel, so that the alcohol, were it left in the mixture in which it had been formed, we should find that the alcohol would gradually disappear and give place to an acid substance. The process is well known to wine-makers and to brewers, and their art consists, amongst other things, in the avoidance of this process of oxydation of their alcohol. While the acetic acid is being formed, oxygen from the air is taken up,

and in that respect this process of acetic fermentation differs from the other three processes of fermentation which I have described. When you make alcohol and carbonic acid from sugar, the air takes no part in the process; when you make lactic acid from sugar, the air is not wanted; and when you make butyric acid from lactic acid, then again the air may be completely excluded and the process will go on without it. But when you make acetic acid from alcohol, you must of necessity allow the free and continuous access of air, and the air gives up some of its oxygen to this fermenting alcohol, to transform it into acetic acid and water by a true process of fermentation.

(To be Continued.)

Operative and Surgical Dentistry.

PULP TREATMENT.

By Hinman Shaw, M. D. D. S.

To Students and Young Practitioners.

An inexperienced young dentist asks my advice on the above subject, and as there may be others seeking the same information, I write what I have to say for the JOURNAL.

EXPOSED PULPS.

If a pulp is exposed in the process of excavating, it should not be destroyed, but efforts made to preserve it alive. To this end, touch it with a pellet of cotton wet in creosote. Then remove all the decay within the cavity that it is possible to do without further wounding the pulp. It is better to leave a little softened dentine over the pulp rather than to run much risk of wounding that organ again.

A broad and very sharp excavator should be used when work-

ing over the pulp, as it is not so likely to cut through and wound it as a smaller blade. Prepare the cavity very nearly or exactly as you wish it to remain when the tooth is permanently plugged. This must be determined by circumstances.

The cavity should now be plugged with *Oxychloride of Zinc* or *Osteo Plastic.*

To do this, turn out on a piece of glass or porcelain, enough of the liquid to fill the cavity; then drop into it enough of the powder to absorb the liquid. While it is in this soft batter state, and before it begins to harden, put a portion into the cavity, pressing it home, gently, with a bit of spunk. The spunk will also absorb the surplus liquid. The operation may be repeated until the cavity is full. The tooth should be perfectly protected from saliva during the insertion of the filling, and also during its hardening. After it is filled, and before getting wet, the surface of the plug should be smoothed and then coated with sandarach varnish. After allowing the latter to dry a moment the mouth may be shut, and the varnish on the plug will protect the latter from moisture, and the oxychloride will harden nicely. If it is convenient to do so, this plug should remain in the tooth a year. If it is on an approximal surface it will probably wear that length of time; but if on a grinding surface it will need to be mended, by adding more material to it after a few months. In some cases the pulp will die, thus treated, but in a great majority of cases it will live in a healthy condition. Sometimes it will live for months in a *dying* condition. The object of deferring plugging the tooth with gold, is obvious enough. We wish to be pretty sure of its continued health before putting in a permanent plug.

Very likely there will be considerable pain when the osteo is first inserted, for a half-hour, or even for a half-day.

The less pain, the more favorable the prognosis. If the pain should continue several days, growing less and less, you must not suppose the tooth is out of danger; for really it may be in a more dangerous condition than at any time previous. *The pulp may have died.*

You must find out whether this is so or not. Throw a small

stream of cold water on the tooth from a syringe, and if it is alive, pain will be felt. If the pulp is dead, there will be no response. If the pulp *is* dead, it must be removed from the crown and *roots* of the tooth; otherwise, periostitis and suppuration will probably follow, resulting in alveolar abscess.

If the pulp continues healthy for several months, there will probably be new dentos* formed between the plastic plug and the pulp.

When it is decided to plug the tooth with gold, it is better to leave some of this oxychloride of zinc over the pulp, and in such other parts of the cavity as may be deemed desirable; never, however, allowing this material to come to the edge of the cavity. This plastic filling, when well put in, is often found to be as hard as the tooth *within* the cavity, and I occasionally leave a considerable portion of it in the tooth, and sometimes make retaining points in its substance.

When we have

A CASE OF EXPOSED AND INFLAMED PULP,

the treatment must be different.

If there has been repeated inflammation of the organ for months, there will have to be considerable treatment for its restoration to health, before it should be plugged with *anything*. The inflammation must be reduced by using aconite tincture and creosote. If portions of the pulp have sloughed, it will be better to destroy the remainder with arsenic, and remove it entirely, when the roots should be plugged.

TO DESTROY THE PULP,

place upon it, or as near to it as possible, within the cavity, a little arsenic which has been ground in creosote. The arsenic should not exceed a sixteenth of a grain in weight. Secure it in place by filling the cavity of decay with a pellet of cotton wet in sandarach varnish. Let this remain twenty-four hours. Remove the cotton and ascertain if the pulp be dead. If it is not dead, you may wait a day or two; and if it is not then

* Dentos—Tooth-bone.

dead, apply the arsenic again. When dead, fill the cavity with tannin paste; that is, tannin that has been dissolved in alcohol until the alcohol will dissolve no more. Seal the cavity with sandarach varnish as before, and let it remain ten or twelve days. By this time a slough of the pulp will have taken place at the end of the roots, and the whole of the pulp and its ramification may often be drawn away at once. The tannin keeps the pulp from putrefying while it remains in the tooth. If attempts are made to extract the portions of the pulp which occupy the root canals, *immediately* after devitalization, there will be a good deal of pain experienced by the patient and a good deal of difficulty by the operator. My experience is altogether in favor of the *waiting for nature* process. In the latter there is generally *no* pain. The root canals are now to be syringed out, and the cavity of decay thoroughly prepared for filling. I should have said that the dentos separating the pulp chamber from the cavity of decay should be removed, so as to have the best possible access to the root canals. The latter, at their entrance into the main pulp chamber, may be somewhat enlarged, with any instrument that will not leave a *square* shoulder at the distal extremity.

A good deal of skill and experience is sometimes required to properly expose the orifices of the root canals, so as to remove their contents, and I cannot stop now to describe the manipulations sometimes necessary, as it would require several pages. Suffice it to say, however, that it is sometimes necessary to *make another cavity* in the crown, or cut away considerable portions of the latter, in order to give proper access to a root canal.

The condition of an empty root canal and pulp chamber is better than when those cavities have dead pulps in them. But an *empty* chamber and canals will cause a tooth to become diseased after a time; probably by receiving more or less of blood-plasmas through the dentinal tubes, which become putrid, and act in the same way as a dead pulp, in causing pericementitis.

Exceeding care, then, should be used in

PLUGGING THE ROOTS.

This may be done with gold, or with osteo plastic.

When done with gold, we must ascertain whether the plugger will reach as far as we wish to carry the gold. If it will enter the roots only a portion of the distance, we need not hope to send gold beyond that point. Small portions of gold only should be used at a time, and that should be *un*-adhesive gold. Sometimes a plugger may he made of whalebone, that will, by adapting itself to curvatures, carry the gold farther than a steel instrument. One can be made for each occasion.

These whalebone pluggers should always be used when the roots are plugged with osteo plastic. As to this latter substance, I have had better success with it than with gold.

I do not know of periostitis or alveolar abscess ever having occurred when I have plugged the roots with oxychloride of zinc.

Make a whalebone plugger, by cutting and scraping down, until it will pass as near the end of the root canal as possible, and mark on the plugger the distance at which it entered the cavity. Fill the canal with the oxychloride as well as possible. Cut off the plugger and force it into the canal and leave it there. When forced home, it should not quite reach the pulp chamber.

The whalebone presses the osteo against the walls of the canal, and makes a filling in the majority of cases more perfect than gold. It also acts as an escharotic and deodorizer, and I think is much better adapted to the purpose than gold foil. The whalebone is as safe as gold within the tooth.

In all cases where we suspect pulp death, after a tooth has been plugged having a *living* pulp, we must ascertain the fact, and if our suspicions are confirmed, we must remove the pulp, thoroughly cleanse the cavity with warm water, and fill it with tannin as before described. This should be removed at the end of a week, syringed again, and plugged as tightly as possible with cotton and sandarach. When the cavity is found to be free from unpleasant odor, the crown may be plugged with

oxychloride for a month or two as a *test*. If there are no symptoms of periostitis at the end of that time, the roots and crown may be *permanently* plugged.

Teeth whose dead pulps have a long time been connected with an open cavity of decay, are very prone to take on pericentitis when shut up by a plug. For this reason the foregoing precautions are highly necessary.

CHASE.

Mechanical and Miscellaneous Department.

NEW CLAIMS FOR OLD INVENTIONS.

In the January number of the present year we published an article entitled "The New Bases, Aluminium and Pyroxylin," in which we gave a detailed description of a method of casting aluminium, which at the time we supposed was something new and original, but we have since learned that substantially the same process was invented by Dr. D. S. Goldey, a description of which appeared in the May number of the *American Dental Review*, 1859. We therefore resign all claims to originality. We have spent some time lately in reviewing the dental periodicals and journals of the buried past, and among the musty lore we find many curious facts. "History repeats itself." The truth of this aphorism is fully verified in our dental literature. Inventions and discoveries which were made years ago and were then freely published and given to the profession, are now brought forward as new inventions, patents obtained or claimed, and the profession required to pay tribute to use them. As a matter of interest, and a case in point showing the slender claim for letters patent the self-styled inventors of Rose Pearl and Pyroxylin have, we publish the following article, which ap-

peared in the *Dental Review*, London, August, 1860, and was republished in the November number of the *Dental Cosmos* the same year:

"Collodion a New Base for Artificial Teeth.—The present may well be called an age of experiment, invention, and improvement, when the wonders of to-day are superseded by the novelties of to-morrow, and that which at one time was declared to have arrived at perfection must give place to an even more perfect arrangement.

"The profession has been revolutionized by the introduction of the hardened India-rubber base, and vulcanite has now become a household word. The dental depots abound in novelties —vulcanite teeth of all patterns, shapes, and sizes; vulcanizers and vulcanizing flasks have variously commanded attention. The war set in with steam patents, dry patents, and superheated patents; every hour brought its novelty, until the profession, surfeited with vulcanite in all colors, and tired of the many improvements flooded in upon them, awoke from its trance to cry, 'Hold! I'll hear no more.'

"Vulcanite was not, however, entirely to take the place of gold, although it might of bone; vulcanite was *not* applicable in every case, and was *not* to be the ruin of the profession. Highly valuable as an auxiliary, an auxiliary alone it must remain.

"No sooner has this fever somewhat abated, than a new rival appears unexpectedly upon the scene. On the fourth of May last, letters patent were sealed to John Macintosh for 'Improvements in Setting Artificial Teeth,' and thus runs the specification:

"'This invention has for its object improvements in setting artificial teeth. For this purpose I employ COLLODION (or a solution of gun-cotton or fibre in a solvent); this material I apply to the teeth to be set when in a fluid or soft state, so that, when it hardens, the teeth may become securely imbedded in it. A form or mould is by preference employed to bring the mass of collodion in which the teeth are set to the proper form to fit the mouth. Cotton or other fibre may be imbedded in the

collodion to increase its toughness, and the outer surface or the whole of the collodion may be colored to look like the natural gum.'

"We will not at present attempt anything like criticism of these so-called 'improvements,' but simply give, in the words of the inventor, some particulars of the process. A model of the mouth is taken in the usual way, and a fac-simile of the piece to be produced moulded in wax with the teeth imbedded in it as in the vulcanite. The collodion is prepared in the usual way, and in order to increase its toughness is mixed with a quantity of 'short cotton fibre,' and then evaporated until the collodion is brought to a 'plastic and putty-like state.'

"'If it be desired to obtain a hard setting, I add to the collodion and thoroughly incorporate with it powdered gum-copal, in quantity varying according to the hardness desired; if great hardness is required, I employ as much as 20 per cent. The collodion, while still warm, I carefully press into the mould around the teeth, as in filling a mould with the compound of India-rubber and sulphur in making teeth of vulcanite, as is well understood; I then place the two parts of the mould together, and force them together by means of the screw with which the box containing them is fitted; thus the collodion between the two parts of the mould is forced into every crevice of it; and in order that the collodion may remain thoroughly plastic, the mould is kept heated to about 200° Fahrenheit; when the two parts of the mould are pressed close together, the mould is allowed to cool, and when cool, the teeth, with the setting, which is then completed, are removed.

"'The collodion is colored to resemble gum by means of alkanet root, and may be colored throughout or only with a gum surface.

"'If it be desired to obtain a plate, or thin, flexible setting, I proceed in a similar manner to that already described, but I produce the two forms of which the mould consists in a readily fusible metal (a mixture of tin and lead answers well) in place of a plaster, as before described; but in this case, after producing the wax model, the teeth are not left in it while the plaster

cast is taken, but are first carefully removed. The collodion is formed into a sheet of the desired thickness, and there is cut from this sheet with the assistance of a template previously prepared by measuring from the mould, a piece of suitable form to produce the setting. I then lay the piece of sheet collodion, previously rendered plastic by heat, in its place in one-half of the mould, and the other half is then put over the first, and pressed firmly down upon it by the use of a screw-box, as before explained. The mould is heated to about 200° Fahrenheit, so as to keep the collodion perfectly plastic, and the pressure applied is sufficient to force the collodion into every crevice of the mould. When the mould is cold and the collodion is set, the collodion plate is removed. The teeth are afterwards fitted in their places on the plate, and are fixed, either by metal pins, or, as is preferred, the teeth are, as before mentioned, made with a passage up the center, which is filled with collodion, and afterwards the collodion in the tooth and the plate at the part where the tooth is to be fixed are both moistened with ether, and they are pressed in contact till the solvent evaporates, when they will be found firmly attached the one to the other.

"'Collodion may also be employed for setting in the same manner as sea-horse tooth is employed, and as is well understood by dentists. In this case a block of collodion (mixed with fibre and copal, if considered desirable) is formed, and afterwards carved out to the form desired, the teeth being fitted and fixed as when sea-horse tooth is employed.'

"The advantages claimed for collodion, or a compound of collodion, as a setting for artificial teeth, are, first, that it does not decompose or become fetid in the mouth; it is also free from metallic taste. Secondly, it is not liable to lacerate the gums; and from the natural flesh tint that can be given to it, it is not easily detected when in use. Thirdly, being specifically lighter than any substance at present employed, and a perfect non-conductor, it consequently can be used upon the most tender gums.

"Although this compound has not been worn more than three months to prove its durability, the most careful experiments have

been tried as to its non-absorbing qualities and indestructibility for the purpose of insulating telegraphic wires in lieu of gutta-percha and india-rubber, which are both absorbents."

We think no one who has seen Dr. McClelland's letters patent, will fail to recognize the fact that all, or nearly all the points claimed by the patentee of Rose Pearl, are embraced in this patent granted to Mr. Macintosh. Comparing these two patents, we fail to recognize Dr. McClelland's claim. Upon the pyroxyline base of Messrs. Brockway, Mayo & Co., there has been no patent granted, so far as we have been able to learn, and we have been credibly informed that no patent can be obtained on this base. In their circulars, the inventors do not claim a patent. They offer to give printed or personal instructions, with license, for $10 or $25, the license being merely a permit to purchase material, — no material being sold to any but licensees.

It will be remembered that the same plan was adopted by the Rubber Company, on the first introduction of rubber. As there is now more than one company manufacturing pyroxyline base, we presume it will soon be for sale to any who may wish to purchase. The amount charged for personal instruction, (fifteen dollars) is not unreasonable, and for any one who desires to use it as a substitute for rubber, the outlay will not be extravagant.

We propose continuing our researches among the records of the past, and will as time and occasion demand, bring them to light.

In what we have said in this article respecting pyroxyline, our intention has not been to prevent the introduction of it as a new base, or to depreciate its value, but rather to warn those of our profession who may not have had an opportunity to investigate this matter for themselves, against being swindled by these patent venders.

We are using the pyroxyline, and are much pleased with it. Our method of manipulating it differs somewhat from the printed instructions. In backing or lining the teeth, in place of using the comminuted material for the purpose, we use the scraps of the

plate, in the same manner as gold or silver lining is put on. We thus secure a firm attachment in less time, and without the shrinkage which takes place with the filings. We have found this base useful in repairing old rubber cases. E.

JOURNALISTIC.

The "*Zahnarzt*" has a letter upon anæsthetics as its leading article.

The danger of employing nitrous oxide gas and other anæsthetics by incompetent and careless operators, has, however, been set forth sufficiently clearly in the American dental journals, so that we have no need of quoting anything upon this subject from our transatlantic exchanges, but we may heed the lesson taught in this article, that there is great danger in extracting teeth and roots for patients under the influence of an anæsthetic and dropping them in the mouth as soon as they are raised from their sockets, for the purpose of gaining time, as upon the return to consciousness they might be swallowed by the patient and serious results ensue.

A fatal case from the use of nitrous oxide is noticed, and in speaking of "Methyl-Æther," the author seems to incline to the opinion that it will finally supercede the nitrous oxide as an anæsthetic.

The second article, upon "Filling Teeth with Gold," is by Dr. G. V. L. The opinion is expressed that the quality of the filling depends more upon the skill of the operator than upon the kind of instruments or the preparation of gold employed.

Several extracts from the American journals follow, and an extract from the Transactions of the Odontological Society of Great Britain, in relation to extraction and replantation of teeth in obstinate cases of periodontitis, the details of which we published some months since.

The author claims that Dr. Coleman was not the first to originate the idea of transplantation in these cases, and cites the ex-

periments of Mitscherlich in this direction, and states that he had himself reported cases which he had treated in this way, to the Central Society of German Dentists at Vienna in 1860. The author does not seem to be much encouraged by the results of his experiments, to continue the practice of transplantation in these cases of periodental inflammation.

A fatal case resulting from the administration of chloral is reported. As we have noticed several fatal cases reported in the journals from this cause, it is well to exercise much caution in the exhibition of this powerful hypnotic.

The London "*Monthly Microscopical Journal*," gives some details under the head of "Progress of Microscopical Science," of the methods pursued in diagnosing by the aid of the microscope, tubercular consumption. In the Microscopical Society of Liverpool, it was stated that there had now been enumerated two thousand four hundred and seventy-nine species of fungi.

From the "*Medical Record*" of February 15th, we clip the following items:

Dr. J. C. Nott recommends the application of carbolic acid in carbuncle.

Dr. C. C. F. Gray, of Buffalo, N. Y., cures varicose veins by external application of potassa cum. calce. This is made into a paste and applied directly over the enlarged veins. In twenty minutes the paste was washed off with vinegar. Eschars were then made the size of a pea, and when these had healed, the case was completely cured.

Aloin, the active principle of aloes seems likely to supercede the use of the latter. The dose is about one-fifth the dose of aloes.

From the "*Pacific Medical and Surgical Journal*." —Mortuary record of San Francisco for 1870.—The statistics of mortality in this metropolis have been published regularly in this journal for years. The tables for 1870 in the present number disclose some interesting points. With the recent census before us, we

can make an exact estimate of the comparative healthfulness of our large cities. It appears that San Francisco is surpassed in this respect by one only of the large cities of the Atlantic States, viz., St. Louis.

The Editor of the *Pacific Medical and Surgical Journal*, in this connection, says, that "in order to present a comparative statement of the mortality of the larger cities of the Union, we communicated with the Health Officers of about fifteen of the larger cities, and through their courtesy are enabled to present the following returns, which for convenience are arranged in tabular form. Still-births are not included."

Principal Cities.	Population 1870.	Deaths in 1870	Ratio of deaths per 1000 of Population.
New York	927,436	27,175	29.3
Philadelphia	657,179	16,750	25.5
St. Louis	312,963	6,670	21.3
Chicago	299,370	7,342	24.5
Baltimore	267,599	7,262	27.1
Boston	253,984	6,096	24.0
New Orleans	184,688	6,942	37.6
San Francisco	150,361	3,351	22.3

From the above table, it will be noticed that New Orleans shows much the largest number of deaths to the 1000 of her population, New York coming next, and then Baltimore, and next Philadelphia, whilst St. Louis shows the smallest death-rate of any city of considerable size in the United States, being only 21.3 to the 1000, and San Francisco 22.3 to the 1000.

It appears also that in San Francisco, consumption, Bright's disease, and diseases of the brain, are becoming more frequent, whilst deaths from accidental causes are diminishing in frequency. Thirty-seven per cent. of the deaths in San Francisco were in children under five years of age. Whilst more than fifty per cent. of the deaths in St. Louis were under five years of age. One death is reported at one hundred and five years, in the Golden City.

The *American Journal of Dental Science* has an article by T. D. Crothers, M. D., upon the "Therapeutic Power of Oxygen Gas." The author quotes Dr. A. H. Smith, and refers to him as the greatest authority upon this subject. "Oxygen is applicable," says Dr. Smith, "to two classes of diseases — one in which respiration is at fault, and the other in which both respiration and nutrition are defective.

"Under the first class are included asthma, emphysema, croup, diphtheria, capillary bronchitis, pneumonia and poisoning by opium. Astonishing cures have followed its administration in each of these diseases. * * * * In phthisis this is the most valuable remedy we possess."

In the *Pharmacist* we find that Dr. Alfred Wright recommends in the *Lancet*, oil of peppermint as a local anæsthetic. Especially is it valuable in neuralgia and gout.

The *Pacific Medical and Surgical Journal* and the *Boston Medical and Surgical Journal* both publish an article headed "Teaching of Dental Surgery in America," taken from the *Medical Press and Circular*, which purports to have been written by the *Times* correspondent in Philadelphia, and first published in the London *Times*. The article in question strikes a sensible man as a sharp attempt to advertise a certain dental school in Philadelphia at the expense of sundry newspapers and monthly journals whose editors were not sharp enough to detect the ruse. J.

MISSOURI DENTAL COLLEGE COMMENCEMENT.

The fifth annual Commencement of the Missouri Dental College was held at the large hall of the Temple on Thursday evening the 9th of March. A brilliant audience of more than one thousand persons was present. The diploma of the College was conferred on the following named gentlemen:

A. H. Fuller, Illinois.
R. Matthews, Illinois.
Alfred Bramsen, Copenhagen, Denmark.
William A. Jones, Missouri.
J. P. Eddy, Missouri.
Geo. McCowan, California.
C. L. Sawyer, Iowa.

Professor Judd, Dean of the Faculty. presented the Diplomas, accompanied with the following eloquent and instructive remarks:

GENTLEMEN: — In relation to the dental profession, it might be remarked, that, as a separate branch of medicine, its history extends but a short way back towards the fountain head of medical science. It has, however, during the few years of its existence, added somewhat to that long list of distinguished names which history has embalmed with their sacred memories, as having belonged to benefactors of the human race.

We might mention that the names of Tomes, of Delabarre, of Nasmyth and of Harris, are known and gratefully remembered wherever literature and science have shed their benign influence; whilst to Wells and to Morton, the world is indebted for the greatest boon which has ever been bequeathed to suffering humanity by the hand of man.

As an exemplification of the energy and enterprise of the profession, we might mention that the first $\frac{1}{50}$ microscopic objective which reached this continent was imported and used by a dentist of New York, and we might notice that the surgical as well as the mechanical treatment of cleft palate originated with dental practitioners. We mention these few facts that you may be stimulated to act well your part in that grand rôle of progress which has developed the little band of dental practitioners of fifty years ago, into a profession numbering fourteen thousand members, who now support nine collegiate institutions of learning, and contribute their share to the scientific and literary productions of the day.

To each one I would say: Let your life be a life of study, of patient investigation, and of effort, and let your highest ambition be to alleviate the sufferings of humanity, and to contribute something to the welfare and happiness of your fellow men.

As the graduates returned from the stage to their seats, after

receiving their diplomas, they were loudly applauded, and some of them received bouquets from their lady friends.

J. S. B. Alleyne, Prof. of Materia Medica, delivered an eloquent, scientific, and interesting address to the students, graduates and audience, who showed their appreciation of it by frequent applause.

MAHLER'S stringed band discoursed delightful music at intervals, as well as before and after the principal ceremonies.

The present graduating class compares favorably with any previous one; the members of it having passed an excellent and satisfactory examination, as well as showing by their zeal in study and continued attendance to the lecture course, that they are determined to take a high and respectable position in the profession which they have chosen. CHASE.

From the "New Orleans Republican."

NEW ORLEANS DENTAL COLLEGE.

The commencement exercises of the New Orleans Dental College took place last evening at the rooms of the college on Carondelet street. The lecture room of the institution was filled by a company of intelligent ladies and gentlemen, who witnessed the exercises with great interest. Among those assembled we noticed a number of members of the dental profession in New Orleans.

The exercises were opened with prayer by Rev. C. S. Hilton, of Christ-church. Dr. J. S. Harrison, one of the faculty of the college, then read an interesting lecture, the subject being "Incentives to the study of the natural sciences." The lecture evidenced great research, and the various subjects it embraced were ably treated. It is to be regretted that the professor omitted some portions of the lecture from the unfounded fear of taking up too much time. Dr. Harrison, at the close of the lecture, made a few judicious remarks appropriate to the occasion,

and addressed more particularly to the students of the college.

The dean of the faculty, Dr. J. S. Knapp, then made a short address to the graduating class, and conferred the degree of Doctor of Dental Surgery on five young gentleman: John A. Arrington, of Tennessee; Thomas D. French, of Mississippi; Herbert Norman, of South Australia; Sidney M. Cook, of Louisiana, and Charles P. Angell, of Louisiana. Honorary degrees were conferred on Messrs. S. J. Cobb, of Te nessee; Rute Waldo Thornton, of Georgia, and Joseph C. Turner, of Alabama.

An address on behalf of the students was then delivered by Mr. Herbert Norman, of South Australia, one of the graduating class. The address was listened to with attention, and received with plaudits.

Not the least interesting feature of the occasion was the bestowal of splendid bouquets upon the graduates by young ladies in the assembly.

A few remarks from Dr. Harrison terminated the exercises.

OBITUARY.

Died: — On the morning of February 14th, after a short illness, our highly esteemed and worthy professional brother, Dr. Henry E. Peebles. A more extended notice of his death will appear, accompaning his photograph, in the succeeding number of the Journal. E.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] APRIL, 1871. [No. 4.

From "The Pharmacist."

ON FERMENTATION.

By PROF. A. W. WILLIAMSON, F. R. S.—Before the Society of Arts.—Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 104).

Now, the question arises whether this formation of acetic acid ought to be classed, as I am at present classing it, amongst the processes of fermentation. If it is due to the absorption of oxygen, you might naturally inquire whether one ought not to place it amongst the common processes of combustion, and it is right that I should state that by some authorities it is at present so classed. My reason, however, for stating what I have done, that it is a process of fermentation, is this, that it is usually effected by the action of a peculiar organism, called a vinegar-plant, an organism which I shall have occasion to show you hereafter, which does exert in that particular process the function of taking up oxygen from the air, and of inducing the alcohol to combine with it. There are many other processes by which we could get it, but the actual process by which we do get it is a process in which this vital organism, the vinegar plant, is the agent of its formation. It might be made by mere processes of combustion, but it is made by a process of fermentation.

There is one singular feature in the first and best known of these processes—the alcoholic fermentation—which you will no-

tice when I tell you something of the way in which the processes of fermentation present themselves, even without very great care on the part of the observer. If, for instance, you were to express the juice of some sweet fruit—say grapes—and if you were to leave that expressed juice in contact with the air for a little time, having first squeezed it through some suitable cloth or filter, so as to have it clear, of course there would be no solid particles in it when you put it aside; but, if you leave that in a tolerably warm place, in contact with the air, you would find that little solid particles would appear in this juice, that they increase in number, and that, in proportion as they increase in number, and as the quantity of them becomes greater, so does the process of effervescence—the evolution of gas from the grape juice—become more and more rapid. These little solid particles, which are not present at first in the grape juice, but which gradually make their appearance when it is exposed to the air, are what we commonly call, in the ordinary case of alcoholic fermentation, in this country, yeast—either beer-yeast or wine-yeast; it is the same organism in each case. The peculiarity of the process is this, that these substances—this yeast—which seems to make the sugar into those products which I enumerated to you, does not disappear while doing the work, but is produced by the very process. The more active the production of these yeast-cells, and the more speedy the growth of these yeast-cells, the more effective and rapid is the process of fermentation, and no fermentation of the kind which I am speaking of at present—the alcoholic fermentation—has ever been known to take place in the absence of these organisms.

That circumstance I just mention briefly at present, but the fact that these yeast-cells appear whenever the process is going on—and the more they grow the more rapid is the fermentation—has led people to suppose at first, and to believe afterwards, that these yeast-cells were the agents of the transformation, the active substances which decomposed the sugar in contact with the water, and induced the transformation which we noticed. Now, the very fact that one of the two substances which are reacting upon one another chemically (because the changes are

chemical in their fundamental nature), should not disappear, but should rather increase by the process, is entirely anomalous—it is entirely at variance with the simplest and best known facts of chemistry; so much so, that if it were not established upon incontrovertible evidence, I believe that most chemists would be inclined to disbelieve it, and to say it cannot be,—it is impossible, —it is a mistake. If you tell me, as a chemist, that this yeast is transforming sugar by its action on the sugar, and that instead of being consumed the yeast is actually increased in quantity by doing that work, I should say it is nonsense—it cannot be, because in all the cases of chemical action which I know best, nothing of the kind occurs, but the very opposite. When one substance acts upon another, each one disappears in the process, and is transformed into a product having other properties. I need hardly give you illustrations of that; but one or two simple cases may not be useless, as serving to fix clearly this important circumstance in your minds.

I will take at first one of a particularly elementary and simple kind,—a process of combustion. I will take a little strip of metal—magnesium wire—and will hold it for a short time in the flame of a spirit lamp, so as to raise it to a sufficiently high temerature. The light you see emitted is due to the combustion of oxygen in the air with the metal magnesium, which I hold in my hand. This is one of the simplest possible cases of chemical action. The metal has disappeared. The strip of wire is gone, and oxygen from the air disappeared also. At the same time a white powder was formed. I dare say you did not notice it, but here is a quantity of the same substance in a bottle. It consists of oxygen from the air combined with the metal magnesium, and the point is this—that all the magnesium which took part in that process disappeared, and went to form this white powder, and all the oxygen which took part in the process also disappeared. The two united together, each disappeared as such and went to form this new product. And, moreover, we can tell, from the examination of the proportions in which the substances combine, exactly what weight of oxygen would disappear for every part by weight of magnesium. If you burn,

for instance, three grammes or three pounds of magnesium, you would require exactly two grammes or two pounds of oxygen. For instance, three pounds weight of magnesium would combine with two pounds weight of oxygen, and the product of the two together would be five pounds in weight. I may show you the same thing with soda, not the substance which is commonly called by that name, which is a carbonate of that base. I have here a little pure soda solution in a bottle. I will pour some into a beaker-glass, and will show you one property which characterizes it, viz: that of changing this red paper into blue. Now I will pour some of this acid body, the oil of vitriol, into another beaker-glass. If I put the paper which has been discolored into this pure acid it would be dissolved; but I will dilute some of it with water, and then you will see that paper, which has been rendered blue by the agency I have just used, is brought back again to red by the agency of this acid. Now, if I mix the acid with the soda, we shall have audible evidence of violent action going on. I will not go on with the process, but I have purposely taken the two substances in presence of very little water, in order to show you that the heat evolved makes the liquid boil with great violence. I could have avoided that by adding water in the first place, but I wished to show you the vigor with which they unite together. If I were to go on adding acid to the soda, little by little, feeling my way until I had just completed the action, I should have got some water formed and some of the beautiful salt which I have here,—a body which is neither soda nor acid; it is a salt called Glauber salt or sodic sulphate, and all my materials would have disappeared in the process. If I use them in proper proportions, all the acid and soda would disappear and go to form these two other products. I might dissolve some of this sulphate in water, and might put red paper or blue into it and it would not affect either of them; it is perfectly neutral in that respect. The proportion by weight in which the combination takes place is this: If I add 40 parts by weight of soda, and 49 of oil of vitriol in a state of purity, I should have as the result, 18 parts by weight of water, and 71 of sodic sulphate, and if I add together the weight of my materials and

the weight of my products, I get the same—89. Nothing disappears in the process; all the acid and all the base which takes part in it is employed. Each particle which took part in the process disappeared as such, and it passed over into another form.

I will mention one other case, because it is somewhat more complex. I may take the case I was showing you just now, the white marble and hydric chloride or muriatic acid, which I used for making the carbonic acid gas. In that case, I used two materials, carbonate of lime, as it is commonly called, and hydrochloric acid. We get three products: on the one hand is a salt, which is commonly called chloride of calcium, a solid substance used for drying gases, as it has a great affinity for water; another is water; and the third, as I showed you, carbonic acid gas. There, again, we have precisely the same thing. All the marble, and all the hydric chloride which takes part in the formation of those three products disappeared as such, and they resolved themselves into other compounds possessing different properties; but the weight of the products is equal to the weight of the materials. That rule holds good throughout all ordinary cases of chemical action.

On the other hand, in fermentation it is not so; one of the active substances is formed, and the more active the fermentation, the more does it grow. In fact, if you want to get yeast, you must go to a place where the breaking up of sugar into alcohol and carbonic acid is going on; or if it is in the south, you must go to where wine is being made, you go to a wine-maker, and get the yeast from him. The only way of getting yeast is from that process of fermentation which sets in spontaneously under the conditions I named to you.

I ought, however, in justice to the wonderful process which I alluded to, to give you two or three other particulars regarding it. I showed that sugar is broken up by the ferment into these products, but no case is known of pure sugar—and when I say pure sugar, I mean sugar in the purest form in which we have it—being decomposed by yeast. If you were to put some ready-made yeast—thriving, growing yeast—into a solution of chemi-

cally pure sugar, some of your yeast would decompose, some of it would resolve itself into other products, and other parts of it would be absorbing those products which are present in the liquid, and whenever the process is to be carried on advantageously and rapidly, it is customary to add some saccharine liquid —some other substance capable of nourishing the yeast. When I want good fermentation I do not take water to dissolve my sugar and put yeast into it, but I boil some of this malt, which is one of the best materials for the purpose, in water, and take a decoction of malt or decoction of yeast and put sugar into it. In such a liquid there are several bodies which we know; and I may safely say that there are a great many others which we do not know, and there is no doubt that their presence is of considerable importance to the chemical change which takes place. There are substances which I shall have presently occasion to show you, and to speak of, formed by the germination of the grain, by the formation of the malt, which are related somewhat to this body which I have here. This was some pure wheat flour—every kind of flour would not do—and it is supposed that some people mix other materials with flour. It was kneaded up with water, pressed together, and, whilst the pressure was being continued, water was allowed to trickle over it. I have in another bottle some of the water that flowed over it. There is a white substance deposited from this water, which is commonly known and much used, by the name of starch, and starch is, in its chemical composition, first cousin to sugar; it is a substance which passes over very readily into a kind of sugar by a process I shall presently have occasion to allude to. But the little ball of flour while being kneaded had the starch washed away from it, and I have left, as the result, a substance which is commonly known by the name of gluten. If I were to describe it in chemical language, I should say it is something like flesh, or the muscular fibre of animals, for, in chemical composition, it approaches very nearly to that. When barley is malted, and kept in a warm place for some time, the grains begin to germinate and decompose, and some bodies are formed from this gluten, which is partially broken up. The malt contains also some sugar made from that starch—grape sugar, as we usually call it.

If we only had these extreme cases, I really do not know what we should do. If we had in our science one set of bodies which appeared so constantly to act at variance with the general laws which the others obey, I think we could not call chemistry a science. I have taken two or three examples to show you the definite proportions which we find to regulate the ordinary process of combination. I might have taken thousands, but the point is that this law does not appear to apply at all to these chemical changes which we call fermentation. One of the active substances in fermentation is being formed, it is increasing, not disappearing at all, and the contradiction is so strong and manifest that the only way out of the difficulty will be to do something of the kind which I was speaking of some time ago, that is to say, see if we cannot get some intermediate facts which will serve to connect the extreme ones; to see if we cannot get at first something between the two classes, and then try to get some further links between them. There are processes of chemical change—I will not call them processes of fermentation, for I do not know whether they are, but which are analogous to it, and some of them are very interesting and very beautiful. I have here a substance called amygdalin, made from bitter almonds. It is a bitter-tasting substance, and consists of four elements which it is not necessary that I should name. In this other bottle I have a paste formed of sweet almonds, which have been crushed with a pestle and mortar, and I will put some of it into the warm distilled water in this flask. Into the mixture I will put some of this amygdalin. If I were to leave it without that addition, there would be very little change; the substance would gradually subside, but there would be no product given off in the way you will presently see. After letting it stand for a few minutes, I will pour some of the mixture into an open vessel, and we shall be able, without difficulty, to perceive a fragrant smell, which is due to the presence of a liquid of which I have a quantity here, a substance known by the name of oil of bitter almonds. If I were to perform the same experiment on a large scale, and macerate some of this amygdalin with almond paste, put them together with warm water, distil the mixture and collect what comes over,

we should find that water would pass over and with it would be a few drops of oil of bitter almonds, and the amygdalin would be decomposed in the process. There is in the sweet almond paste, a substance which I cannot describe in better terms than by comparing it to that gluten which I showed you just now. It is very similar to it in its composition, and by the contact of this, the synaptase, as it is called, with the amygdalin, the elements of the amygdalin are broken up into several products; one of them is the oil of bitter almonds, another is prussic acid, which generally accompanies the oil, the third is a variety of sugar, of the kind which is called grape sugar, and there is probably also some formic acid. Here we have the breaking-up of a complex body—amygdalin—into several simpler bodies by the action of the body called synaptase; but there is not in the process, as far as I know, any living organism at work. There is a substance which is somewhat similar to these living organisms, but there is no organized structure, as far as our knowledge goes at present.

(To be continued.)

ON THE FORCE OF THE HUMAN HEART.

By Andrew Buchanan, M. D., Professor of Physiology in the University of Glasgow.

As the force of the human heart is a subject that can never lose its interest to physiologists, I desire to submit the following observations upon it, suggested by an estimate of it recently made by the Rev. Dr. Haughton, of which an account is contained in the *Dublin Quarterly Journal of Medical Science*, vol. xlix., p. 47, under the title "On the Mechanical Work done by the Human Heart." I merely premise that I wish to speak of the reverend gentleman with the most perfect respect, and that I am not the less indebted to him for his testimony on behalf of my opinions that it has been unintentionally and, indeed, unconsciously given.

I shall first endeavor to show that the solution of the problem of the heart's action proposed by Dr. Haughton is, so far as it goes, essentially the same as that which I laid before the profession nearly two years ago. I shall next endeavor to show that Dr. Haughton's solution, although capable of determining the mechanical equivalent of the work done by the heart, cannot be employed to determine more minutely the work which the heart actually performs, and gives us erroneous ideas when we attempt so to employ it.

Let it, in the first instance, be taken for granted that there is no error in the data on which our respective computations are based, so that we may have nothing to consider but the use which is made of them.

The three elements which Dr. Haughton assumes as the groundwork of his computation are, that the heart contracts 75 times in a minute; that at each contraction the left ventricle of the heart discharges three ounces of blood; and that the hæmastatic column in man stands at a height of 9.923 feet. He now multiplies the quantity of blood discharged at each contraction by the height of the hæmastatic column ($3 \times 9.923 = 29.769$), and regards the product as indicating the number of ounces that are raised one foot by each contraction of the heart. He again multiplies the product by the number of contractions of the heart in 24 hours, and so he obtains 89.706 foot tons as the measure of the daily work done by the left ventricle of the heart.

In addition to Dr. Haughton's three elements, I avail myself of a fourth — viz., the area of the ventricular orifice of the aorta, which I estimate with Kiel as equal to .4187 of a square inch, and which I regard as an element of the very highest importance in the solution of the problem of the heart's action, and the more so that it can be determined with ease, and is therefore more worthy of reliance than are some of the other elements.

Supposing, then, that we add the element just mentioned to Dr. Haughton's other three, the following is the mode in which I employ these elements to determine the force of the heart.

The weight of a cylinder of blood 9.923 feet in height, and having a base of .4187 of an inch, is 30.20838 ounces. Three ounces of blood, which the heart discharges at each contraction, fill of such a cylinder 11.8245 inches, or .985375 of a foot. Now, multiplying together the two numbers thus found, I obtain a product of 29.769, the identical result obtained by Dr. Haughton—

$$30.208 \times .985375 = 3 \times 9.923 = 29.769.$$

I had, therefore, reason in saying that Dr. Haughton's computation is essentially the same as mine, seeing that their results are identical.

The same coincidence holds with respect to my own computation, and comes out still more strikingly, owing to the greater simplicity of the numbers. I assume that the heart beats 72 times in a minute, that it discharges two ounces of blood at each contraction, and that the height of the hæmastatic column in man is 88 inches. Now the weight of a cylinder of blood, eighty-eight inches in height, and having a basis of .4187 of a square inch, is 22 ounces. Further, two ounces of blood, the quantity discharged at each contraction, fill exactly of such a cylinder, 8 inches. Dr. Haughton's computation is 2×88, and that is exactly equivalent to my computation, 22×8; the common product being 176, which denotes the number of ounces which are lifted one inch at each contraction, and by dividing 176 by 12 we obtain the number of ounces that are lifted one foot—viz., 14.66. Dr. Haughton's number for each contraction is more than double, 29.769; but, in addition, he makes the heart beat 75 times a minute, instead of 72 times, so that his total estimate of the day's work is to mine in the proportion of 30.774 to 14.66. But this difference does not depend on any difference in our modes of computation, which lead exactly to the same result, but merely on the different magnitudes assumed of the elements which form the base of the computations.

Neither are these accidental coincidences; for it is easy to show that the numbers obtained by Dr. Haughton's method are necessarily the same as those obtained by mine. For let W de-

note the weight of a cylinder of blood having a base of .4187 of an inch, and a height (H) equal to that of the hæmastatic column, and let h be the portion of that cylinder equal in volume to the blood emitted from the heart at each contraction, while w denotes the weight of the same quantity of blood. Then as the weights of any two portions of the same liquid are as their volumes, we have —

$$w : \mathrm{W} :: h : \mathrm{H};\ \text{and consequently}$$
$$w\,\mathrm{H} = \mathrm{W}\,h.$$

Now, Dr. Haughton's method consists in calculating w H, and mine consists in calculating W h quantities, which are necessarily equal, so that the two methods must in all cases lead to the same result.

I have thus shown that the solution of the problem of the heart's action proposed by Dr. Haughton is, so far as it goes, essentially and necessarily the same as that which I laid before the profession nearly two years ago, and I now proceed to show that Dr. Haughton's solution, although capable of determining accurately the mechanical equivalent of the work done by the heart, cannot be employed to determine more minutely the work which the heart actually performs, and misleads us when we so employ it.

To determine the work actually performed by the heart is a problem quite different from that of determining the mechanical equivalent of the work done. The very same effective force is required to raise one pound to a height of ten feet, as to raise ten pounds to a height of one foot, or five pounds to a height of two feet, or two pounds to a height of five feet. In all of these cases and others innumerable, if we descend to fractional numbers, the mechanical equivalent is the same, or ten foot-pounds; but the operations themselves are very different, and with respect to any organ acting in the living body, or any inanimate machine, we would not rest satisfied till we knew which was the operation it actually performed. Now it is just so with respect to the heart. There are questions in physiology, as Dr. Haughton has shown, to answer which the mechanical equivalent of the

heart's action, or the total amount of its effective force, is all that we require to know. But there are other more important questions for which that meagre knowledge is insufficient. The physiologist wishes to know, not only the amount of the effective force of the heart, but also in what precise way or ways that force is expended within the body. What is wanted will be better understood when I say that the effective force of the heart communicates to the blood its momentum, and that the momentum of the blood is expressed by $(q \times v)$ the mass of blood which is set in motion multiplied by the velocity with which it moves. Now we should at once attain our end if we could determine the respective values of q and v. But it is just because we cannot do so directly, that we are obliged to have recourse to empirical formulæ. But such formulæ are only valuable as they agree, term to term, with the rational formulæ $(q \times v)$. Now Dr. Haughton's formulæ $(w \times \mathrm{II})$ and mine $(\mathrm{W} \times h)$ cannot both agree, seeing that the terms are inverted—that which expresses the mass moved in the one, expressing the velocity of the other. We must judge, therefore, which of these formulæ gives the most probable view of the moving mass and velocity of the blood. Taking Dr. Haughton's data, and viewing them in the light of his own formulæ (w II), we have three ounces of blood moved 9.923 feet at each beat of the heart, or with an initial velocity of nearly 750 feet per minute; which is manifestly a *reductio ad absurdum*. But if to the same data we apply the formula $(\mathrm{W}\,h)$, we invert the ratio of the mass to the velocity, and find 30.2 ounces of blood moving over .985 of a foot at each beat of the heart, or with an initial velocity of 73.875 feet in a minute; which, though a high rate, is no longer so extravagant as to be incredible.

In conclusion, I may be allowed to say that I am still inclined to think favorably of my own more moderate estimate—that the heart at each contraction exerts a force which would be in equilibrium if counterbalanced by a weight of 22 ounces +129.28 grains. The mode in which this force is expended is most easily explained by supposing that we have a tube 88 inches in height, and .4187 of an inch in base, that this tube is exactly filled with

blood, and that at each contraction of the heart two additional ounces are forced into it at the lower end, lifting the whole column over a space of eight inches, and causing an equal overflow at the top. This represents accurately the labor of the human heart, and supplies us with two numbers to express it; the one, twenty-two ounces, being the weight of the column of blood; and the other, eight inches, the space over which the column is lifted. The former of these numbers denotes the resistance that has to be overcome in forcing two ounces of blood into the aorta, and pushing before it the whole mass of blood in the blood-vessels; the latter, again, denotes the velocity with which the blood issues from the heart. Multiplying these two numbers together we obtain the momentum which the heart communicates to the blood—twenty-two ounces moving with the velocity of eight inches during the period of a pulsation, or of ten inches per second, or fifty feet per minute. This is equivalent to 176 ounces (22×8) lifted one inch, or 14.66 ounces lifted one foot, during the period of a pulsation; or 65.9 foot-pounds in a minute, or 42.3 foot-tons in twenty-four hours.

P. S. The facility with which the force of the heart, in whatever aspect we choose to contemplate it, can be obtained from the weights and volumes of the columns of blood, at A, B, C, which have severally a basis of .4187 of an inch, seems to me to show well the importance of assuming the area of the ventricular orifice of the aorta as an element in computing the force of the heart.

A is the calculated hæmastatical column.

B is the observed hæmastatical column.

C is a column equal in volume to the capacity of the left ventricle of the heart.

Weight in oz. av.	*Volume, as height of column, in inches.*
A=22.301	89.165797
B=22.	88.
C= 2.	8.

1. Statical equivalent = A = 22 ounces + 129.28 grains.

2. Dynamical equivalent = B × C, the weight of the one into the volume of the other.

$$\left.\begin{matrix}22\times\ 8.\\ 2\times 88.\end{matrix}\right\} = 176 \text{ inch ounces} = 14\tfrac{2}{3} \text{ foot ounces.}$$

3. Momentum of blood as emitted from the heart, = weight B × volume C = 22 ounces moved over a space of eight inches at each pulsation, or with a velocity of ten inches per second.

Glasgow, October, 1870.

From the "Dental Register."

"ARE THE MINERAL ACIDS FORMED IN THE MOUTH?"

By Edward C. Chase, D. D. S., Iowa City, Iowa.

In the October number of the Register, 1870, I find an article reviewing and criticising a paper published by me in the May number of the *Missouri Dental Journal*, of 1870, with the above heading.

Now, I have no objection to having anything criticised which I may offer to the dental profession, through the medium of the journals, *provided* the critic thoroughly understands what he is talking about; but I do most emphatically protest against having my articles cut up, sentences taken from here and there, and made to serve an entirely different purpose from which they were originally intended; and most of all do I regret that one who is apparently unfamiliar with the new nomenclature, should copy my chemical formulas—based upon the new nomenclature—and parade them in the columns of a widely-circulated dental journal, with the remark that "none of the chemical formulas are correctly given," thereby not only making me appear ridiculous, but utterly ignorant of what I am writing about.

I have no disposition nor desire to enter into a controversy with the writer upon what constitutes a mineral acid. By the general acceptance of the term, all of those acids come under

this head, which, when united with some base, form a compound or salt, which is known in common language as a mineral, such as calcium sulphate, potassium nitrate, sodium chlorate, etc.; and as these salts or minerals are formed by the action of sulphuric, nitric and hydrochloric acid respectively, upon calcium, potassium and sodium, or some of their compounds, they would naturally be classed under the head of mineral acids, to distinguish them from those acids which are formed and occur solely in the organic or vegetable kingdom.

In speaking of the formation of nitric acid, I said "it is commonly prepared by the action of sulphuric acid upon potassium nitrate, thus: $KO_3\ N + H_2\ SO_4 = HK\ SO_4 + HN\ O_3$" nitric acid.

Also, in speaking of the action of nitric acid upon the carbonate of lime, I gave the reaction as follows, which is correct: $CaO_3\ C + {}_2HNO_3 = Ca_2\ NO_3 + CO_2 + H_2\ O$. Imagine my surprise on being told by one so well known and universally respected, as the writer of the article referred to, that "none of these formulas are correctly given." Can it be possible that the author is ignorant of the fact that chemistry has changed within the last ten years; that a new chemical nomenclature has been adopted; that the science has been progressing, and that none but "old fogies" adhere to the old formulas?

In one place in my article the symbol for sulphuretted hydrogen occurs. I gave it then as I do now: H_2S. This formula he says is incorrect, that it should be HS, one atom less of hydrogen.

Now, a man who has studied chemistry within ten years, should know that both formulas are correct—the first represents the number of atoms, the latter the number of equivalents of the different elements in the compound; by all modern writers who have adopted the atomic theory, it is written H_2S.

The old symbol for sulphuric acid is, $SO_3 + HO$, but now it is written H_2SO_4, which explains more clearly the nature of the combination. The old symbol for water is HO, that is, one equivalent of hydrogen and one of oxygen, but at the present time it is written H_2O, or *two atoms* of hydrogen and *one atom* of

oxygen, or by weight two of hydrogen and sixteen of oxygen, while in the old formula it stands one of hydrogen to eight of oxygen. It will be seen that the proportion is the same but the formulas are different. Both are correct. Now it is very unkind for one to accuse another of ignorance in writing the symbol for water H_2O, when he himself has not kept up with the progress of chemical science, or if he has, fails to show it in his writings. Also, the old formula for nitric acid has been changed from NO_5 to HNO_3, that is, one molecule of pent-oxide of nitrogen combined with one molecule of water, gives two molecules of nitric acid, thus: $N_2O_5 + H_2O = 2HNO_3$.

Thus it is, most of the formulas used a few years ago, to express the composition of the different chemical combinations have been changed; the equivalent theory has been discarded and the atomic theory adopted, so now instead of saying that the equivalent of oxygen is eight, we say that the atomic weight of oxygen is sixteen. This is adopted by Fownes in his last edition, the universal text-book for dental and medical students; by Roscoe, the great English chemist, and by Heinrichs and Baker, and others who stand at the head of the profession of chemical science.

To one unacquainted with chemical nomenclature and chemical formulas, it would appear by reading the review by this well known writer, that in treating the subject of the "mineral acids," I was handling something of which I was perfectly ignorant.

I will say, however, for the benefit of those who may not have seen the article in question, and therefore have not examined it for themselves, that I defy any one to point out a single mistake in any of the formulas, or in any of the reactions as published by me in the *Missouri Dental Journal*. All that I desire in this article, is to show to the public that I am right in my chemical formulas, as given in the article under consideration. As for the theory advanced in that paper, that these acids, sulphuric, nitric and hydrochloric, might be formed in the mouth under certain conditions, I leave for each one to accept or reject, as the reasoning by which I draw my conclusions may seem plausible and consistent or otherwise.

PLUGGING TEETH.

I have thought it might be interesting to the young practitioners of the present day to compare the practice of a first class operator in the year 1848 with the best modes of the present day. The following three papers on "Plugging Teeth" are taken from the *Dental News Letter* of October, 1848, and the January and April numbers of 1849, written by J. D. White. M. D., D. D. S., Professor of Anatomy and Physiology in the Philadelphia College of Dental Surgery:

Messrs. Jones, White & Co.

GENTLEMEN—Agreeably to request, I will endeavor to furnish you with as concise a description of plugging teeth with gold as my time and abilities will allow.

As this operation is of ancient origin, and is practised to a much greater extent at the present day than at any other known period of the world, it is a sufficient reason that we should bestow upon it all our talents and energies; and that it is the most important branch of duty which engages the attention of the dental practitioner, no one will, I believe, for a moment doubt.

My remarks will be entirely confined to the use of gold as a substance for plugging, as I do not wish for a moment to engage in the storms of controversy which have extended over our whole country of late years, with reference to the use of compounds of the baser metals and amalgam. Various as have been the descriptions of this operation by authors, there are none, as far as I have seen, that will enable the young practitioner to produce a very satisfactory result, and very few agree with regard to the manner in which it should be done.*

There is no art, the mechanical execution of which affords a wider scope for a display of dexterity and gracefulness of manipulation than that of plugging teeth; for it is literally mak-

* I wish to be understood as writing for the young, and not for the old.

ing a workshop of the mouth; and to approach a highly sensitive patient in a slovenly and bungling manner, must of necessity be rendering an unpleasant operation at best, really distressing and painful; hence many preparatory requisites, apart from the mere instruments used in plugging, are highly necessary. It is presumed that the patient is seated in a suitably constructed chair, for the maintenance of an easy posture in any desirable position—desirable as well for the operator as the patient; this is indispensable for the proper execution of any operation upon the teeth. Every patient should be supplied in the first place with a clean napkin, a glass of water, and spittoon within convenient reach. Many remark that the water should be tepid, but this is not often requisite; water of the temperature of the operating room is generally most suitable, because the friction upon the teeth by the filing, scraping, etc., fevers them more or less, and cool water is more advantageous than otherwise, as it is refreshing, and keeps down vascular congestion of the teeth and gums; if a highly sensitive tooth is prepared for plugging, merely filling the cavity with a pledget of cotton will prevent a thrill of pain to the patient while rinsing the mouth, while lukewarm water favors a determination of blood to the mouth, and promotes a relaxation of the parts generally. The operator should invariably wash his hands and instruments before examining the teeth of a patient, to avoid unpleasant associations relative to cleanliness; this simple neglect may give the patient a disgust to every thing that he may do thereafter. There is no point upon which a patient is more sensitive than this. He must never approach a patient without a napkin in his own hand also, because he should have the convenience of wiping every dampness of the saliva from his fingers, and any substance from his instruments that may get upon them during an examination of the teeth.

Preparation of the Cavity.—First determine as nearly as possible the depth of the cavity, with a view to the reduction of its margins, (I have reference here to the cavities on the approximal surfaces of the teeth,) and for this purpose the file is the most useful instruments, which should be of various construc-

tion to suit the different localities of the teeth;* for the front teeth, the usual separating file, cut upon both sides, may be used when it is desirable to reduce an equal portion of each tooth; but when one tooth is decayed and the other sound, a file cut upon one side only is generally most suitable, because we can not only avoid, if we wish, cutting away the sound tooth, but the smooth side of the file can be depressed against it, so as to cut away more of the affected tooth upon the posterior part than upon the anterior; an effect which is always desirable, in order that the separation shall be much wider upon the back parts of the teeth than upon the front; for two important reasons, first, that the plug may face backwards to obscure it from view, and secondly, that in the act of biting into any substance of food, it will glide upwards and outwards upon the inclined plane which the surface of the plug and tooth will present, as that is the direction of the motion of the inferior maxilla when biting with the front teeth; in this way the plugged surface is constantly kept clean; to face the surface of the plug outwards by a careless use of the file is inexcusable, when it can be avoided. It is in almost all cases desirable to reduce one-half of the enamel of the sound tooth so as to make the approximal surfaces as nearly equal in appearance as possible, and that sufficient projection shall be left along the lower boundary of the cavity near the necks of the teeth to prevent the filed and plugged surfaces from ever touching again. It is frequently desirable to file the posterior margin of the cavity concave; for this purpose, a thin file with an oval cut, and a flat, smooth surface, is indispensable, because the smooth surface can be depressed against the anterior margin of the adjacent tooth, so that the oval surface will cut away the posterior margin of the affected one in a concave manner; I mean that the convex side of the file shall not touch the front parts of the teeth, unless they are much decayed. Looking from behind forwards, the separation should present the view of an abrupt termination of a cone, instead of a square

*As the file becomes warm, as well as the teeth, of course it should be kept wet and cool, by frequently dipping it in cool water.

notch or slit, which a file with two parallel surfaces is calculated to produce. As the enamel is thinner on the back parts of the teeth than the front, and frequently breaks away before decay is observed by the patient, this method of filing is frequently indispensable.* I do not wish to be understood that the front view of the separation between the front teeth shall also be of a cone shape;† yet they should be filed away sufficiently to remain slightly separate. If they should fall together at their cutting edges in a few months after they have been filed, then separate a little more, for the teeth will often decay between the plugs and cutting edges. In some few cases, where there is a great disproportion between the breadth of the cutting edges and the necks of the teeth, back as well as front, which, when they are decayed near the gum, it would be impossible to file away the cutting edges sufficiently to allow the necks resting together; in such cases it is not common for the teeth to decay near their coronal‡ extremities, and when they are not decayed, they should not be filed, but should be plugged, and a tape or piece of silk daily passed between them in order to keep the teeth and plugs clean. With reference to the bicuspid and molar teeth, a similar rule for filing to that of the front teeth should be observed, except that the separation should present a shape resembling a cone with its apex towards the necks of the teeth, for which purpose a file of similar shape should be used, as well as a file resembling the letter V, and be certain to cut away sufficient of the coronal extremities of the teeth to ensure a continued separation, and sufficient of the enamel of the face§ of the tooth, to prevent it breaking away by mastication

*The filed surface of a tooth should never terminate at an angle near the neck, but on the contrary it should terminate at nothing, in order that every portion of the exposed bone should be covered with the gold, so that in cleaning with a tape it will touch all parts of the plug and tooth.

†It should be the constant study of the operator in filling the front teeth to preserve their natural symmetry as much as possible.

‡I shall use this term to indicate the cutting edges and prominences of all the teeth.

§I shall use this term to designate the grinding surfaces of the molar teeth.

after the cavity is plugged. Very frequently, the facial margin of the cavity opposite the middle of the crown must be dressed in a concave line, running from the lingual to the buccal extremity of the tooth, as the enamel is more brittle, imperfect, and thin, corresponding with the crevices or cliffs of the faces of the teeth, than at its coronal extremities. The most important principle to be observed is, that the teeth be filed sufficiently to prevent breaking away after they are plugged, and present an inclined plane facing towards the opposite jaw.*

Another very useful instrument is a kind of chisel, similar to a joiner's small paring chisel, slightly bent, so as to bring the edge in contact with the tooth with facility. Some should be constructed with the edge parallel with the shaft of the instrument, similar to a strong gum lancet. These instruments made small are are indispensable for opening the facial cavities, because the openings are often mere crevices or fissures, and the enamel being very hard, a blunt burr drill will not enter very well, yet this form of drill is often invaluable, and any kind of a flat drill will become bound between the opposite margins of the cavities, and give great pain in attempting to rotate it. A small and pointed triangular drill will often be useful when the openings are very small, and triangular scrapers of different sizes are also requisite. As the direction of the enamel fibre is from the surface of the tooth to its centre, of course its cleavage is in that direction, and the chisel leaves a thin and oblique margin to the cavity of decay, which must be reduced by the file, as a straight, thick and strong margin is necessary to fit the plug to.

If the foregoing papers meet with your approbation, gentlemen, I will be pleased to continue the subject in your next number, and speak of the further preparation of the cavity, characteristics of decay, the instruments used in plugging, &c., &c.

J. D. White, M. D.

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*Many are in the habit of separating the teeth with cotton, India rubber, soft wood, &c., but it is unsuccessful as it is unphilosophical. If the decay of the teeth is at all favored by contact, then the practice is unsound.

Messrs. Jones, White & Co.

GENTLEMEN—The favorable reception that my first communication has received, is a sufficient apology for me to furnish you with a continuation of my last article on *The Formation of the Cavity for Plugging.* For this purpose, numerous small cutting instruments are necessary, not only to approach all parts of the cavity of decay, but to enlarge it in any desirable direction; for it is not presumed that the freaks of decay will always form a cavity best suited to retain a plug; besides, gold foil cannot be consolidated, unless as fast as placed in the cavity, it is embraced by its parieties more and still more firmly at every effort with the instrument. Yet it is not indispensable that it should do so in every direction, or when only the first portions of the plug are introduced. A very good and simple method for a young learner to adopt, when he has dressed the margins of the cavity, is to lay a straight instrument across them, and then to cut down at right angles from it; in this way he is sure to give the cavity a proper shape; in short, it is the business of the dentist to shape the cavity to suit himself, so far as it can be done without injuring the tooth. A cavity best suited for plugging is where the parieties run from the orifice to the bottom, parallel to each other; and this character should always be obtained as far as practicable upon the coronal extremities of the teeth, especially when they are disposed to wear down. What are commonly termed the hatchet-shaped, and scoop or hoe-shaped instruments, of different sizes, bent at different angles, are necessary; they can be obtained ready made, but every dentist should be capable of shaping the points and tempering them to suit himself; it is impossible for the instrument maker to judge of and produce the various niceties of temper and shape which these instruments require. Small flat drills, for drilling catches for the plug upon different parts of the cavity where they can be applied, are also requisite. The following is a very easy and effectual method of tempering this kind of instruments—first file and bend the instrument suitably, then heat it a very little above a cherry-red in the flame of a spirit lamp, and suddenly plunge it into cold water, (or sealing wax, which

is perhaps better,) placed close enough to the point while heating, to prevent it from cooling much in passing from the flame to the water; now it is as hard as it can well be made, and to exert much force by bringing it in contact with any hard substance would break it almost as easily as glass, to prevent which, polish one side of the point upon a stone, so as to distinguish the slightest tinge of change in color; then place the neck of the instrument again in the flame, with the cutting edge jutting through about half of an inch, and impinging upon a piece of cold steel; held in this position a few moments, the polished surface of the instrument will be observed to change to a light straw color, which will deepen until it turns blue; when this light straw color reaches the point of the instrument, it should be again plunged into cold water; now polish the instrument, and it is fit for use. The reasons for this process of tempering are obvious; it is desirable to make the neck, and especially the angles or curves of the instrument, of a light blue color, which is spring temper; as t is important that is should yield to pressure without breaking, and that it can be slightly bent at pleasure to suit any temporary purpose, and at the same time the cutting edge should be very hard. As the edge is much thinner in most cases than the neck, the same amount of heat that would render it light straw color, would not be sufficient to reduce the neck to a blue, but the cold steel in contact with the point conducts off the heat whilst sufficient can be applied to the neck to turn it blue. In this way the temper can be so regulated that the edge can be extremely hard, while the instrument will bend up to an eighth of an inch of the point; so that we can cut the hardest tooth substance, as with a diamond set in steel, without its breaking.

Characteristics of Decay.—On this subject authors differ very widely; and while we do not wish to be understood as attempting to settle this difficult question, still a few remarks upon some of its properties, etc., may not be out of place. It is asserted by some that every particle of *decay* must be removed from the cavity preparatory to plugging, (to this we most heartily assent;) and by others, that every vestige of *colored* substance must be removed, that the tooth may present a white and healthy appear-

ance! Now whiteness is not always a healthy sign, as sometimes the softest decay is whiter than other parts of the tooth; nor again is a black appearance always a sign of decay. How is it with the darkened and polished surface of stationary decay, so called, and which is more dense than the sound tooth?—the tubuli having filled up with some kind of matter, rendering the dark spot frequently less indestructible than the surrounding tooth substance. Examine such cases after being stationary for years, as is the case sometimes, and when decay again commences, it is either by a white and softened margin, or by a whitened centre. While tooth substance is changing from a healthy state to a state of decay, it is not black, but white, brown, or yellow, as the case may be; but it often becomes black after it has partially decayed. The tubuli take up fluids which *become* colored, or coloring *matter* is imbibed from the decay without the structure of the tooth being at all broken up; that they are capable of doing so, is proven by immersing a tooth in the tincture of red saunders, which will color it as dark as dark mahogany; but the tooth never turns white without a loss, or breaking up of structure. So it will be seen that color is not an invariable criterion to judge by, whether a tooth is decayed or not: but texture combined with opacity and discoloration is, except when we approach the cementum, *it* being about the same texture as partial decay. It is well known that in many cases where the decay is discolored, a dark line is observed running along the tubuli, from the decayed portion, almost as soon as it is through the enamel, down to the pulp cavity. I will cite a single case as an illustration. A gentleman who had been residing for some time at New Orleans, accompanied his sister, who was having her teeth operated upon, to my office, and while there, expressed a regret that he could not have his teeth plugged also; and upon inquiring the cause, he informed me that the nerves always had to be exposed by cleaning the cavity, and it was so painful that he could not bear it, and even if he did, his teeth became diseased at the roots, and had to be extracted. I requested him to allow me to examine then; he assented, and, upon examination, I remarked at once that I could plug them without exposure of the nerve by

cleaning; I convinced him that the dark portion of his tooth was as hard as the white, and to remove that which had lost its density of structure was sufficient; this has been done, and many valuable teeth saved for years. This darkened character of the tooth substance is not uncommon in tobacco chewers, and it is obvious that as the tubuli of the tooth run from its periphery towards the pulp cavity, that when the impervious enamel is removed by any cause, that they will take up coloring matter of any kind, and become discolored. Others assert, again, that partial decay may be left in the tooth, and that decay will not go on if the cavity is plugged solid. It is not impossible that the partially decayed bone will not become hard again by infiltration of calcareous matter from the pulp, in the same way that the cementum is formed; but it is not often true that decay will not go on when a tooth is plugged in this way, because there is sufficient heat, moisture and air pervading at all times in the tooth, to favor chemical decomposition when a nucleus of decay is once formed, yet decay may not be as rapid as when the tooth is not plugged. Now, it is almost needless to say that the instruments used for cleansing and forming the cavity should be as thin and sharp as possible, and have sufficient strength to bear slight pressure, because the decay, as well as the sound bone, is sometimes exquisitely sensitive to the touch,* and to attempt to prepare a cavity with a thick and dull instrument in such cases, would excite undue and unnecessary pain; besides, the sharper the instrument, the more readily the difference in the texture of the decayed and sound bone is distinguished. A small lock of cotton, lint or napkin should be held in the hand, to wipe the decay from the instrument as fast as it is taken from the tooth, as well as to wipe it from the cavity and from about the tooth, in order to keep it out of the mouth as much as possible.

Material for Plugging.—Great care is necessary in selecting,

* We do not intend to give any directions with reference to the treatment of this condition of the tooth, or the treatment of the pulp, as it is too important a subject to be treated without a due consideration of its physiological and pathological conditions, to do which would interfere too much with the arrangement of the present papers.

as well as for preserving, material for plugging. It should be kept in a dry place, and a weight placed upon that which is not wanted for immediate use, in order to prevent the air from getting in contact with it, as it will render it more or less brittle and dusty; by leaving it exposed to the air, it loses a peculiar freshness, which renders it less capable of being firmly packed. What is commonly termed No. 6, is better suited, perhaps, for general use than any other thickness, because it is not too stiff or strong to be packed into a cavity where the parieties are weak, nor too light to make a very hard and compact plug in a cavity better supported. But we apprehend a great deal may depend upon the habit of the operator, because some prefer No. 4, and others fifteen or even thirty grains to the leaf. It is generally asserted that the lighter leaves should be used for the small cavities, and the heavier leaves for the larger ones; but we are in the habit of using the thicker leaves for the smaller, and the thinner leaves for the larger cavities, for the reasons given above; the lighter leaves can be firmly packed with less force, but they require a longer time than the heavier ones, and when the cavity is very large the parieties are weaker than when it is small. It is believed by some that gold cannot be used with the same success when the cavity is badly shaped, or the tooth frail, or when there is a very small hold for the plug, as tin; we must confess we were once of the same opinion also, but that opinion had been partly formed by consulting the views of others, and from transient experience, but practice, and a better knowledge of packing gold, have led us to a very different conclusion. It is obvious that gold is best, under all circumstances, and that tin should not be used except as a temporary filling, or a matter of economy. Tin may be made impervious to air and dampness, but it will corrode in most mouths, unless it comes in contact with the food in chewing, and then it rapidly wears away, as it does not become hard by packing or under pressure, as is the case with gold; in other words, gold will become hard and brittle by hammering, and tin will not. This is the principal reason why gold can be more successfully employed in a cavity where there is a very small hold, than tin; because it is

clear that a small hold with a hard metal, and one that can be made harder proportionate to the pressure applied to it, is more secure than it would be with a softer metal; and that tin "forms a kind of union with the tooth," differing from gold, is too ridiculous to be more than mentioned, and that the walls of the cavity are not strong enough to bear the pressure of consolidating gold, is equally so; if the tooth will not bear much pressure, use thinner leaves. We are sure that No. 4 can be firmly packed with as little pressure as can tin; but the gold must be well prepared, not only of uniform thickness, but pure, malleable and properly annealed, all this requiring care on the part of the one who prepares it. J. D. White, M. D.

[Want of space compels us to defer the publication of the last of these three papers until our next issue.—Ed.]

TO WESTERN DENTISTS.

By W. E. Driscoll, Bedford, Ind.

Having been an admiring reader of The Missouri Dental Journal almost from its inception, I propose addressing a few words to those whose more immediate duty it is to sustain it.

Sustenance in this case means money in subscriptions, and ideas, fresh and practical, in contributions to its pages. What man can sit down to this "feast of reason and flow of soul," or the accumulated productions of the brain and heart of the profession, without feeling that "swelling of the heart," he never felt before, to make some greater return than the paltry subscription price? If there be such I have not the egotism to suppose anything I could say would change them.

But to those who sometimes do feel a slight glow of fraternal feeling in response to some professional revelation that would have taken him years to have worked out for himself, I would say, "Do as you would be done by," my friend, and you will feel all the better for it, and be rated much higher by your professional brethren.

Those who have given you unsparingly the results of long study and experience, deserve the same from you. In taking a position in the ranks of the profession, you may have taken the place that otherwise would have been filled by one who would have labored for the advancement of our specialty; you are therefore under obligations to do what you can to make good the loss you have occasioned by taking the place of an abler man.

Whoever desires to see dentistry occupy a position above a common trade, or distinguish himself above those who, so far as in their power it lies, degrade it, must *do something* to make the distinction visible. To claim a distinction that we make no effort to make a reality, is a species of humbuggery that is sure of detection and disgrace. Let every one, then, understand that he has no special claims to consideration above those who do nothing for the profession, until he does something for its advancement.

Does any one fear his first or second article might be rejected? What if it is? He will be all the more likely to try to do better next time. The Editor of long experience is certainly a better judge than one upon his first effort. When you have done your best, that is all we set out to insist on, and this brings us to a good place to close this. *Only do your best.*

Mechanical and Miscellaneous Department.

"THE PERKINS-HYATT BASE."

The attention of the profession has very recently been called to this new base, as a substitute for rubber, and in reply to many inquiries respecting it we copy the circular received from the inventors, taking the liberty also of comparing some of the statements made in it with what we know of the base. And we do this, not with any desire to prevent its introduction, on the con-

trary it would give us pleasure to aid the introduction of a base possessing the advantages *claimed* for this, and especially when offered in the liberal spirit this has been, but as a word of caution against taking all of the statements made in circulars, prepared and sent out to make sale oftentimes of some worthless trash, as true, no matter what the professional reputation of those interested may be.

The base in question may be a good one for cheap work, worth all that is asked for it, but we would not advise any one to be too hasty in adopting it.

[CIRCULAR.]

Office of the Albany Dental Plate Company.

We take great pleasure in announcing to the Dental Profession, that we are in possession of a newly-invented and patented material for dental plates or bases for artificial teeth, that cannot fail to delight every dentist who desires a better material for the purpose than hard rubber.

Our material is named "The Perkins-Hyatt Base." It is given this name because the compound is the invention of I. S. & J. W. Hyatt, Jr., and its application to dental purposes was made, in conjunction with the Brothers Hyatt, by Dr. J. A. Perkins, well known to the dental profession.

The main features of this new base are as follows:

1. It is lighter and at the same time stronger than dental vulcanite or hard rubber.

2. Its color is very near that of the natural gum, and will not change in the mouth.

3. It is entirely free from all unpleasant taste.

4. It is not in the least affected by the acids of the mouth.

5. It is not injurious to any mouth, even the most sensitive, which is not true of rubber plates containing a large amount of mercury.

6. It can be manufactured and fitted to the mouth easier, quicker and more satisfactorily to the operator, than can be done with any other known base for artificial teeth, saving enough time and trouble to the operator to pay for the plate.

7. It is more pleasant and comfortable to the wearer than dlates made of any other material whatever.

But a better understanding of the nature of this new base, may be had from the following description of the plates and the method of adapting them to use:

The plates are furnished by us in three different styles; one for upper sets, one for lower, and one for partial; each in assorted sizes. They are made free from the liability of shrinkage.

In making a set of teeth with "The Perkins-Hyatt Base," the case is prepared and teeth set in the plaster exactly by the same process and in the same manner as is done in preparing to make a set with hard rubber, except that the trial plate should be made thinner. Care should be taken to use the best quality of plaster, and to thoroughly dry the casts before proceeding with the final process.

Around the outside of the teeth, next to the flask, is cut a channel, connected by short canals or gates with the inside, to receive the excess of material.

When the flasks are thus prepared a plate of our base of proper size to approximately fit the mould, is selected. The plate is then placed in the lower flask, and the upper flask upon it, when the two flasks are put into the screw clamp, ready to e forced together, just as would be the case in using rubber. The clamp and flasks are then set into a small tank of oil (good sweet oil works finely and emits no odor). A gas jet or alcohol lamp, placed under the oil tank, is then lighted, and the oil is heated up to 300°, (*never above* 310°,) which is determined by a thermometer attached to the vessel. As the oil heats, the plate becomes softened and plastic, the clamp is gradually screwed down to place, scarcely any force being required until the last, when the proper degree of heat being reached, the flasks are forced *firmly and completely together.* The clamp and flasks are then lifted out of the oil, and if the flasks are seen to be entirely together on all sides, the work of moulding is done. The flasks and contents are then immersed in cold water and *thoroughly cooled*, when, upon opening the flasks, the case will be seen to be moulded in the most perfect manner, the teeth firmly attached, and the shape of the plaster moulds perfectly taken to

the minutest particular. The case is then freed from plaster with brush and water, and finished and polished exactly as would be done with rubber. Chalk is used as a last finish with cotton wheel and water.

A set of teeth can be made with our base, in from one-third to one-quarter of the time required in working rubber. No unpleasant odor fills the room or attaches to the hands. Every thing is neat, convenient and clean; and manipulating the material from first to last is a positive luxury.

In working our base, no instructions further than the above, are required by any dentist who is acquainted with the use of rubber.

Our apparatus consists of a tank, with thermometer attached, for heating oil, a screw clamp, and a pair of flasks. The oil tank is of a neat and appropriate shape and size; the clamp strong and easily worked, and the flasks exactly adapted to the purpose.

PRICES.

Upper, Lower and Partial Plates, assorted sizes, each,	$1.00
Apparatus complete,	7.00
" in parts,—Oil Tank,	2.25
Thermometer,	1.00
Clamp,	2.50
Flask,	1.25

We charge nothing for licenses. The right to use goes with the plates. Each dentist will pay only for what he uses.

We offer the "Perkins-Hyatt Base" to dentists with perfect confidence that all will be abundantly satisfied that it is superior to any other known base for artificial teeth.

Our apparatus and plates will be on sale at the various dental depots as fast as we can furnish them.

All orders sent to us, accompanied with draft or P. O. money order, or with directions to send by express, C. O. D., will be promptly filled.

I. SMITH HYATT,
Secretary of the Albany Dental Plate Company.

From the well known professional reputation of Dr. Perkins,

we were prepared to accept as true most of the statements made in the above circular, and to hope that a substance had been discovered at last that would take the place of rubber. We ordered material and apparatus for working it, feeling confident that we should get something better than any thing we have had for a cheap base. We received what we ordered, have tried it, and are sorry to say have been disappointed; our expectations have not been realized in any considerable degree.

We find the base to be a compound of collodion (made by dissolving gum cotton in camphor), with gum copal, or some other vegetable substance, to prevent the shrinkage. In comparing the material we received with the statements made in the circular respecting it, we find first, that while it is a little lighter than rubber it is *not* as strong, being unfit on this account for partial cases, of one or two teeth. Secondly, its color, reddish pink, is very little better than that of rubber. It may not change color on being worn. Thirdly, It is not entirely free from all unpleasant taste to those who dislike the taste of camphor; some patients undoubtedly will not object to its use on this account. Fourthly, It may not be injurious to any mouth not sensitive to the effect of camphor; in our own case the effect is decidedly unpleasant. Fifthly, It *can* be manipulated as easily as rubber. Sixthly, We question the assertion that it is more pleasant to the wearer than plates made of *any* other material. We do not find it as pleasant or comfortable to wear, as either gold or rubber. Seventhly, The assertion that a set of teeth can be made with this base, in from one-third to one-fourth of the time required for working rubber, is simply not true. The manipulation of this base being precisely that of rubber, except the packing and vulcanizing, will of course require the same time. To pack and vulcanize a rubber case will require from fifty minutes to an hour. To thoroughly dry the moulds preparatory to packing the Perkins base, especially in the solid flask sent us, will require at least 30 minutes; to heat up the oil and pack the case, twenty minutes, making fifty minutes, the time it takes to pack and vulcanize a rubber case, or nearly.

The odor of boiling sweet oil, combined with that of camphor,

is quite as unpleasant as that of sulphur from the vulcanizing of rubber. It may be considered neat, clean, and a perfect luxury to some persons to work this base, but we have no desire for such luxuries. It may prove superior to any known artificial teeth, but we are not prepared, from what we have seen of it, to admit it.

It will undoubtedly do very well for temporary work, for full sets, or sets of eight or ten teeth, but for partial sets of scattering teeth it does not possess the requisite strength to make it of any value.

An important item seems to have been overlooked in the circular. No mention is made of the mode of repairing this work. Any base to compete with rubber must be as readily and easily repaired. We doubt if the Perkins base possesses this quality.

We think that a base will yet be produced from collodion superior to rubber, but do not think it has yet been reached. This base may be a step in advance—we hope it is.

We have seen one case, a full upper set, which has now been worn two weeks with perfect satisfaction. The patient was an old lady, who had been wearing a badly fitting rubber plate, and who had been in the habit of making great use of the spirits of camphor. As this plate fits nicely it is certainly an improvement on the old rubber one, and the taste or smell of camphor is no objection in her case. *Missouri Dent. Journ.* EAMES.

JOURNALISTIC.

"THE ST. LOUIS MEDICAL AND SURGICAL JOURNAL,"

for March, presents several articles of interest. We notice a communication from J. H. Tyndale, M. D., of New York, upon the employment of cold baths in the treatment of typhoid fever, in which he claims that the ratio of mortality has been reduced by this treatment from three to five per cent.

This treatment was practised to some extent, even in the last

century, but has now been again revived, and has received the approbation of many physicians of note on both sides of the Atlantic.

The rationale of cure is at once apparent, as soon as it is stated that in fever there is an actual increase in the heat of the body as evidenced by the thermometer, and the system is brought down to the normal standard by the cooling process.

It is also necessary to premise that in many cases of death from fever no anatomical lesions can be discovered, and it is probable that in these cases the exalted temperature is finally the cause of death, the primary exciting cause having passed away.

Theodore Meyer, M. D., of Belleville, Ill., reports a case of rupture of the left ventricle of the heart, with recovery. The case was *diagnosed* with the greatest exactness, and there can be no doubt—in the mind of the author—of the correctness of the conclusions arrived at in relation to this extraordinary case. We commend all broken-hearted swains and maidens to Dr. Meyer, of Belleville, Ill., that their rent hearts may be healed.

Dr. S. Weir Mitchell in an article in

"The American Medical Journal,"

reports numerous cases showing conclusively that the use of the bromide of potassium, sodium, ammonia, and lithium produces eruptions, sores and ulcers on the skin.

"The Medical Investigator,"

a Homœopathic journal of medicine, has an article by S. B. upon "Difficult Dentition." After stating that it was but a short time since he "sat at the feet of learned Professors in a Medical College," he proceeds as follows:

"One of the Professors expatiating on the effectiveness of homœopathic remedies in almost every condition of human suffering, took occasion to denounce the practice of lancing the gums in difficult dentition. He said considerable on the subject, the sum of which was, that in true homœopathic practice, lancing was never called for.

* * * * * * * *

"I made bold to remark that in tending my fathers flocks I had saved many a lamb, by timely cutting its gums.

* * * * * * * *

"I drew upon myself what I expected, — a little laugh and many a look which said, 'you had better have kept still.'

"But to continue: Now that I am having a little practice in caring for babies, I must give you a bit of experience in that line.

"A few nights since, I was called, in great haste, to see a child that had just had a fit. I found the child was having spasms. I administered the homœopathic dose according to the symptoms as they appeared to me, and I thought with some success. The patient had no more spasms for a number of hours. But the paroxysms returned. I applied myself dilligently, seeking counsel from Guernsey, Raue, Lippe and others, that, if possible, I might get the remedy that was exactly homœopathic to the condition. But the spasms kept coming more and more frequent, and harder, and it did seem as if the child must die. The parents gave it up. But finally, as it came out of a terrible spasm, and just as it was going into another, I went for the little tooth, which was pressing hard against a tough membrane. The operation was soon done, *and the little sufferer was just as soon relieved.* It went right to sleep, and slept sweetly for half an hour, and it has not had another spasm yet."

"The Cosmos,"

for March, has an article continued from the February number, by A. C. Castle, M. D., which was read before the New York First-District Dental Society, in January 1871, entitled "Notes for a Memoir on the Pathology of the Teeth." We learn from the author that "it is the province of these notes for a memoir on the pathology of the teeth, to demonstrate that the dental system holds pathological communion with the whole body, and that medicine possesses the power of reaching the abnormal changes in dental disease." That the author supposes that he has embarked upon an unknown ocean, and that the path which leads

to a consideration of the "constitutional characteristics of the teeth," has been hitherto unexplored, is evident, as he remarks on page 59 of the February number, that "these writers—*i. e*, writers on pathology—have altogether avoided constitutional peculiarities."

Harris says—after premising that the same causes do not always produce the same effects—"their effects are determined by the tendency of the organism, and the susceptibility of the part on which they act; both with regard to the *constitutional* and local diseases. This is true of the organism generally and of all its parts separately considered, but of none more than the teeth, gums, and alveolar process.

* * * * * * * *

"With the teeth, these differences of susceptibility to morbid impressions, are implanted in them at the time of their formation."

As this refers as plainly as language can well do to "constitutional peculiarities," we must conclude that our author had not reached Harris in his readings upon this subject.

But Delabarre recommends mothers having teeth *constitutionally* bad, to abstain from suckling, and that this highly important office be entrusted to a nurse having good teeth, and thus avoid the transmission of so troublesome a heritage.

Mr. Tomes says: "It can, however, be scarcely doubted that an imperfect organization of the teeth, if not the result of some special disease, such as measles, influencing the system generally, is yet consequent upon a constitutional condition."

As both of these authors have not "altogether overlooked constitutional peculiarities," it is evident that our author had overlooked them in his readings.

But Garretson, in his work on the "Diseases of the Mouth, Jaws and Associated Parts," says: "In the treatment of every case of dental caries which may present itself, the careful practitioner first endeavors to satisfy himself of the causes, *constitutional* and local, influencing the diseased condition. Of the constitutional causes, all affect the integrity of the teeth which are deteriorative to the system at large. Unhappily for the dental

organism, primary unhealthy impressions made upon the teeth while in their formation or pulpy state are apt to influence more or less their character for life." Garretson, then, does not seem to have overlooked the "constitutional peculiarities of the teeth."

Now, in view of these facts, would it not have been advisable for our author to have at least looked into *some* dental work before making the assertion that writers upon the pathology of the teeth had altogether overlooked constitutional peculiarities.

We have been somewhat particular in making up this point, in order that no one may be surprised at the phase of the various *scientific* points which are to follow. We do not propose to notice the grammatical *peculiarities* of this rare specimen of dental literature, but shall confine our observations to a very brief consideration of its literary and scientific characteristics.

One anatomical fact of considerable importance is here stated, which as it was not known to Grey or Wilson, should not be lost. Speaking of the fifth pair of nerves, he says: "This pair of nerves anastomosing with the seventh pair of nerves forming the *respiratory* nerves, and those of expression of the face." We quote this simply for the benefit of Grey and Wilson.

Another quotation, which follows below, and which illustrates quite forcibly the aquaintance of the author with the dental and medical literature of the day, needs no comment: "Is it not singular, after hundred years' experience, that up to this moment physicians, surgeons, oculists, *nor* dentists have ever suspected, or if they have suspected, they have never applied their understanding to investigate and demonstrate the pathological-sympathetic affections of the dental system with other organs." A little farther on we find, "while the first or milk teeth are being formed of corpuscular and molecular soft gelatinous *predominance*," etc. We were not before aware that a "soft, gelatinous *predominance*" in any form was one of the elements from which milk teeth were formed.

In speaking of second dentition, he remarks that "gelatin and *earthy* dentition tissues are in perfect organized union, as the substance of the teeth was originally intended, in its physico-phys-

iological-pathological-mechanical harmony," We think *that* harmony lucidly modified, to say nothing about a *physiological pathological harmony* in perfectly formed teeth.

In the continuation of the same subject in the March number of the *Cosmos*, while speaking of the "internal vital principle" in certain kinds of teeth, "its peculiar action is exhibited by a spontaneous cause produced from the internal blood-vessels secreting and depositing in and through the tubuli or pores, a new material, osteo-dentine; which not only is forced into the capillaries of the dental bone, but also saturates and forms a thick covering over the carious surface, thus furnishing a natural protecting shield."

What a surprise this will be to those benighted histogenists who have always supposed that this *osteo-dentine* was only formed within the pulp chamber, and not upon the outside of the dentine, and who up to this time have been wofully ignorant of this method adopted by nature for the treatment of caries of the teeth.

In speaking of fissures, he states, that "if left alone they remain free for many years, or, in the course of time they are obliterated by the wearing down of the teeth, or are *filled* in by osteo-dentine."

We are not informed in what way this osteo-dentine is organized, but we suppose it is accomplished in some new way without the intervention of any dental organ.

In some remarks upon abrasion of the teeth, we find another characteristic exemplification of the literary acquirements of the writer, as follows: "Another form—and the only one alluded to by writers, and by them termed '*denudation*'—is the wasting away of the teeth without any apparent cause."

Now, Harris speaks of denudation of the teeth, and gives a chapter to its consideration, but his denudation and this author's "another form" of abrasion have nothing in common, and then in another chapter he gives a complete description of the disease, as described by the writer of the article in the *Cosmos*, under the head of spontaneous abrasion, and a third chapter follows upon mechanical abrasion of the teeth. Mr. Tomes

treats of mechanical abrasion. Mr. Bell treats of spontaneous abrasion and of denudation, and yet we are told that this spontaneous abrasion is the *only* one alluded to by writers, and by them termed *denudation*.

But we quote once more. "And once the dignity of its true character being recognized by the light of pathogenic truth," etc , etc.

Let us look at the force of the expression, "pathogenic truth." The word "pathogenic," which has not yet found its way into the lexicons, must be the adjective corresponding to the noun pathogeny and consequently signifies disease-begetting, or disease producing, and the phrase *disease producing truth*, gives a fair idea of the plain English of the two words, which is not only plain English, but is also plainly nonsensical.

Men who could write something really instructive, if they would confine themselves to some practical points with which they were familiar, only expose their ignorance when they attempt to teach others what they do not understand themselves.

We heartily wish that there was no necessity for such comments upon the communications which we find in the journals, but if such monstrosities in dental literature go unnoticed, the whole profession necessarily becomes to a certain extent responsible for them, and are judged according to their standard.

Another article in the March number of the *Cosmos*, by Thos. B. Hitchcock, Professor of Dental Pathology, etc., in Harvard Dental School, gives some valuable statistics in relation to the capping of dental pulps with oxychloride of zinc. Only six cases of known failure in one hundred and five.

The author states, "These failures have made me more cautious, in this method of treatment." These statistics are valuable when carefully gathered up and utilized, and we wish we had more of them from all parts of the country.

My own experience coincides very nearly with that of Dr. Hitchcock, with about the same proportion of *known* failures, and like him I find myself more cautious in making use of it for capping nerves, and more inclined to destroy the pulp in very unfavorable cases.

In the report of "The Ondontographic Society of Pennsylvania," Dr. Kingsbury stated that in attempting to extract a bicuspid tooth, he could only raise it some three or four lines in the alveolus, all the force which he thought it prudent to exert not sufficing to remove it from the socket. Being satisfied that it was a case of exosotsis, he delayed the operation for five or six days, when the changes that had taken place in the bony structures surrounding the tooth, in consequence of the inflammation which had supervened from the former attempt at extraction, the tooth was easily removed.

In "The Susquehanna Dental Association," the discussion turned upon "bleaching teeth." It was generally conceded when teeth had been discolored for a considerable period of time, it was usually impossible to restore them to their original color.

In Professor Garretson's clinical reports we find that he recommends, in cases of caries of the maxillary bones, the injection of zinc, iodine, and tinct. of capsicum, thrown in once in two or three days, and if this fails to assist nature in the performance of a cure after a resasonable time, he would cut down and remove the diseased bone. In

"The Pacific Medical and Surgical Journal,"

for March, we find an article translated from the French by Dr. D. Woorster, upon "The Physiological and Therapeutic Effects of Chloral," by M. Buchert.

We learn from this that Dumas endorses fully the theory of Liebreich in relation to the conversion of chloral into chloroform, in the system, through the influence of the serum of the blood, which had, however, been disputed by MM. Demarquay, Kirshaber, Dieulafay and Labbé. The author recommends it highly in cases of chorea. It should not, however, be given in organic affections of the brain, or heart, or lungs. J.

The seventh annual meeting of the Illinois State Dental Society, will be held at Galesburg, on the second Tuesday (9th) of May, 1871, commencing at 10 o'clock A. M.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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CONSERVATIVE DENTISTRY.

By George H. Cushing. — Read before the Chicago Dental Society.

The subject assigned to me for this evening, is one, the importance of which I think is not properly appreciated, and in attempting its treatment, I am met at the outset with the inquiry which I know is made inwardly by many minds if not outwardly by many lips: "What is conservative dentistry?"

I should not perhaps have thought it necessary to attempt any elaborate definition of the term, if I had not heard two gentlemen of the profession, among the most intelligent and advanced of my acquaintance, making the inquiry as to the meaning of the term which constitutes the heading of this paper; so, though the matter seemed so clear to my own mind, I have upon reflection concluded that it is very probable that the term may convey little significance to many minds, and, therefore, demands that it should be as briefly defined as is consistent with a fair understanding of the subject.

Conservative is defined by Webster as "having power to preserve in a safe or entire state, or from loss, waste or injury; preservative." It comes from the Latin "con," and "servare," "to keep, to guard!" The term has been greatly in vogue for several years past, as applied to general surgery, though it is doubtful if any uniformity of definition prevails among medical men.

Prof. Rae, of Rush Medical College, says: "Conservative surgery is conventional, meaning, as I understand it, preservative surgery, and is generally applied to the place between extremes. It is usually applied as antipode to heroic surgery."

Professor Gross in his work, in the chapter on "Excision of Bones and Joints," says: "Excision differs from amputation in this, that while in the latter the bone is removed along with the soft parts which surround it, in the former the bone alone is cut away, the integuments, muscles and other tissues being retained, in order that they may contribute to the future usefulness of the limb, or, in other and more comprehensive language, while in the one case all the structures are destroyed, in the other as many of them as possible are preserved. Hence this department of surgery has very appropriately been denominated 'conservative surgery,' and it is most gratifying to know that it constitutes one of the leading characteristics of the healing art of the present day." He thus seems to confine the term, in its application, to that especial division of surgery.

Again, Dr. Davis, of New York, has published a work entitled, "Conservative or Mechanical Surgery, as exhibited in remedying some of the mechanical causes that operate injuriously, both in health and disease." Thus, there would seem to be no authoritative definition of the term among surgeons, yet I believe there is a broader and deeper significance to the term than any of the definitions above given would seem to imply, and one which is generally felt among surgeons, although perhaps difficult to define. I think it clearly has reference to those advanced methods of pratice, which have of later years become so general in any and all departments of surgery, which tend to lessen the frequency of operations involving great loss of structure, either by substituting less formidable ones, or by anticipating disease, so that in many cases no operation at all is necessary.

The surgeon following this higher order of practice thus becomes the conserver — preserver — his province is, "to keep" — "to guard" — not only the life and health of his patient, but also the integrity of his body to the very fullest extent.

If, then, there is this important application of the term con-

servative in relation to general surgery, how much more emphatically should it apply, as in reference to the specialty of dentistry.

It is true that the dentist has not to operate on organs or parts of the body involving, as a rule, such important relations to the vital functions, or to locomotion, or to general usefulness, as the general surgeon has; nor do his operations often threaten danger to life or general health, but his field is a very important one, and upon his successful operations, or otherwise, often depends to a great extent, not only the comfort, but the health of his patient, and his skill should be as conscientiously applied as though he were operating on more vital organs. He is constantly called upon to decide between the immediate loss of organs of the economy, or the effort to preserve them. In his case it is utter loss of those organs on the one hand, as against the attempt to preserve them on the other, while there is not, as is often the case with operations in general surgery, the danger of fatal consequences to be weighed in forming a decision.

There are those in the profession who hold that there is a moral obligation binding upon all men, not to mutilate the human body in the slightest degree beyond what is actually demanded as a "dernier resort," to remove otherwise incurable disease, or in case of extreme suffering, or the removal of obnoxious deformities. Such men will tell you "it is a sin to extract a tooth." Without taking the extreme position which this class occupy, I will still say that there is more truth in their assumptions than the profession generally are willing to acknowledge. The province of the dentist is essentially that of a "conserver"—a "preserver." He is in duty bound "to keep" and "to guard" that portion of the human body which it is his province to treat, as much as for the general surgeon to save to the uttermost that which lies within the province of his art to treat.

Let us then inquire as to the present status of the profession as regards this sort of practice—how we stand as in relation to the past, and what can be forecast regarding the future—touching briefly some of the prominent points in relation to the subject which seem to demand especial consideration.

The time was, and not more than twenty years ago, when the prevailing practice was to extract most aching teeth, except perhaps the six anterior teeth in either jaw, — or, if such teeth were not extracted, the majority of honest practitioners gave little encouragement to the patient for any prolonged usefulness of a tooth, the pulp of which had to be devitalized before filling. Dating perhaps from that time, advancement began to be apparent in the methods of treatment of teeth with exposed pulps, and greater thoroughness in the operations of removing the devitalized pulps and filling of the pulp chamber and canals, brought with it greater encouragement as to this method, until a few years later the thorough and conscientious practitioner could honestly advise his patients to have this operation performed, as promising reasonably of success. This was eminently an advance in "conservative practice," and so marked that I doubt not all of you here present can corroborate the statement, that while, even ten years ago, the usual remark of the patient when coming to us with an aching tooth was: "Doctor, I have an aching tooth, I want you to extract it," — that to-day the large majority say instead, "Doctor, I have a bad tooth, I wish you would see if you can do anything to save it." And while two years ago it was very difficult to persuade some patients — and very many, too — to consent to the attempt to save the tooth by devitalization of the pulp, to-day it is sometimes difficult to persuade people to have a tooth extracted, even when there is obviously no other course proper to be pursued.

This is evidence of remarkable advancement, for when you find the people educated to the point of demanding such operations, you may be sure that the operations have met with favor, through the established evidence of their reasonable success.

Recognizing the demands of this conservative principle, earnest men in the profession, even as long ago as twenty-five years, or thereabouts, turned their attention toward devising some method of treatment of exposed pulps, which should render it possible to fill such teeth, and retain at the same time their vitality. Various methods of capping exposed pulps were pursued, and some with occasional seeming successes, but after years of

experiment and experience, the profession came to decide generally that the capping of exposed pulps was not a reliable practice, and it was in the main abandoned, and devitalization and extirpation held almost undisputed possession of the field, until the introduction to the notice of the profession of the method of capping with oxy-chloride zinc. This method has seemed to prove thus far, more successful than any previously tried, and although it has not yet been tested by sufficient length of time to justify us in pronouncing fully upon its merits, it certainly can be said to give great promise for the future, and through its aid we may reasonably hope to arrive at the highest point to be attained in "conservative practice."

These are the most striking features which present themselves in a review of this subject, but there are others almost as important, and in connection with which there are some points which especially demand our consideration.

The introduction of cohesive foil and gold, inaugurated a marked era in dental art, rendering possible the performance of very many operations which otherwise, or with soft foil, could never have been performed. In this way the crowns of teeth can be restored, and the organs rendered almost as serviceable as the natural ones, and the operations can be rendered reasonably permanent, while otherwise many such teeth could not be successfully treated, and would early fall a prey to the forceps, and others could only be treated with partial success by the use of amalgam, that always uncertain material, even if there were no other objections to its general use.

The class of operations here referred to have frequently been derisively termed "*fancy operations.*"

They are fancy operations in just the sense that the "excisions of joints" are fancy operations, as compared with operations of amputation of the entire limb, of which Professor Gross — as before quoted — says, "it is most gratifying to know that it constitutes one of the leading characteristics of the healing art of the present day." I am glad to be able to say, that the same expression may be used as applied to our specialty, for such operations are eminently conservative, and are daily coming to be better understood and more justly appreciated.

The improved methods of manipulating cohesive foil, together with the superior character of instruments of late years introduced, which have come to us as the result of earnest thought and experiment, tested by experience from leading men in the profession, leave no excuse for most men to use any other material than gold for filling in a large majority of cases. And yet, notwithstanding the great advance which it has been affirmed has been made toward true conservative practice, we find to-day, very often, in large cities particularly, a class of operators, and first-rate operators as well, who use amalgam to an alarming extent. Men who command first-rate fees too.

You will often hear such men say, "I frequently hear of Dr. A. or B. charging forty, fifty or sixty dollars for an operation, but I never could bring my conscience to the point of making such charges." To those acquainted with the operations of such men, the reason is very obvious—they never perform the operations which entitle a man to such a fee. In such cases they invariably use amalgam, when gold could be used to much greater advantage to the patient, and where, did they use the gold, they would find that their consciences would not only allow them to charge such fees, but that they could not conscientiously perform the operations for less.

It is just here that I think a large part of the profession fails to appreciate the demands of the conservative principle; neglecting to do their duty by their patients, either through fear to demand a just recompense for their skill and labor, or from disinclination to make operations demanding so great an outlay of time and nervous force. There are many practitioners who follow this course through ignorance, and sin blindly; but for such there can be no excuse offered, because if they attend the Societies faithfully, take and read all the journals studiously, and inform themselves as fully as they can, it will be made clear to them that such operations as those just referred to can be made with gold successfully, and of a much more lasting character than with any other material, and they should learn to do these things, nor rest satisfied until they can perform successfully the operations which so many around them have long been and are still constantly performing.

I wish particularly to call attention to this point, and not so much that of the younger members of the profession, as of the older — for to the latter, as a general rule, the temptation comes with more force, to shrink the responsibility and fatigue of such operations, than to the younger members. The older members generally feel perhaps that their reputations are established, while the younger have theirs still to build up.

Again, the temptation comes to most of us almost daily to extract teeth which we feel assured may be preserved by careful pains-taking treatment.

We dread to undertake operations which we know will be tedious and discouraging, both to the patient and to ourselves; and so many times we try to convince ourselves against our real convictions, that the best that we can do for our patients is to advise extraction. This we surely have no right to do, for we are not thus doing our highest duty — if there is any thing higher than simple duty — and that duty is to be found in simply living up to the conservative principle.

It may be safely affirmed, as a general rule, that where there is reasonable hope of ultimate success, the attempt should always be made to save a tooth, and it should be restored as fully as possible to its original usefulness. Anything short of this for our aim is not truly conservative.

These are the main points to which I desire to call your attention, but it must not be forgotten that prevention is better than cure, and that the highest expression of conservative practice will be reached only when we can successfully address ourselves to prevention rather than cure.

What I have said imperfectly upon this subject has been with a view to enunciate a great principle, and is not to be understood as condemning *in toto* certain practices, as for instance, the use of amalgam, which under certain circumstances is unquestionably invaluable, or with reference to extraction, for clearly that is frequently demanded; but it is affirmed that according to our light our endeavor should always be conservative.

The mistake must not be made in the application of the term conservative, in its sense of being opposed to change or innova-

tion — which is one of its definitions — for conservative practice in surgery or any of its branches depends for its very life upon change and innovation — it is essentially progressive.

The endeavor has been made to place this subject before you in a manner that might be comprehended, and with the hope that the importance of it might be impressed upon your minds. In that hope I shall leave the subject, summing up briefly the definition of conservative dentistry as the conscientious application of the highest attainments in our science and art, tending always to the conservative — the preservation of the teeth in a safe or entire state, keeping and guarding them from greater loss of structure than is absolutely essential they should suffer in the process of restoring and saving them.

The advance which has been made in this direction during the past ten years, gives us great encouragement to hope for the future, that conservative dentistry will ultimately attain to a near approach to perfection, and rank deservedly among the highest specialties of surgery.

To this end we should not forget that every individual owes it to his profession, himself and the public, to advance by every means in his power, the science and art of his chosen calling, that that day may the sooner arrive, when conservative dentistry shall be crowned with the well-deserved praise of carrying healing and beneficence on its wings. Missouri Dental Journal.

From "The Pharmacist."

ON FERMENTATION.

By Prof. A. W. Williamson, F. R. S.—Before the Society of Arts.—Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 128.)

Take another experiment. I have here something which is not a *blanc mange*, although it looks something like it; it was made by boiling potato-starch with water. We let it cool, and then

turned it out; some was put into a flask with two or three ounces of crushed malt. It was warmed to a temperature of 60° Centigrade for about an hour; there was no boiling. The substance was then squeezed through a cloth to keep back the husks of the malt, and here is the liquid which ran through. It is perfectly liquid, and its consistency is entirely different from that of starch, from which it was made; it is quite sweet to the taste, and there is a large quantity of sugar in it. There is also another body which we class with the sugars; that is, there is in this liquid a good deal of a kind of gum, which we call dextrine, which would easily pass into sugar. The starch, when it was being converted by the action of the malt into those soluble bodies, did not, so far as we know, break up into simpler substances; the process was of a different kind. It assimilated the water—the starch combined with the water, and at the same time divided itself, some of it forming one and some the other product. Here, also, there was not, as far as my knowledge goes, any ferment or any organized cells in the liquid. If they were present it was an accident, and was not essential to the change which took place. I am the more confident in saying that no ferment was there present, for we can get, and we very often do get, precisely the same formation of starch without any malt at all. If, instead of warming some of that starch with the infusion of malt, I had mixed it with a little —about five per cent.—of that strong sulphuric acid, and had heated it, it would have been dissolved almost like sugar in water. In fact, there are now in Germany, and also in England, manufactories in which starch is converted, by the action of dilute sulphuric acid, into grape-sugar, and the same change which we get by organic substances—that is the point—we also get by the action of this mineral acid.

Another change of the same kind I may mention, especially as the subject of it is in itself interesting. I have here a substance which people have been accused of making for the purpose of adulterating quinine. It is made from willow-bark, and is believed to possess febrifuge qualities, so that there was some little excuse for what I have mentioned. This substance is called salicine, and when heated with dilute sulphuric acid, in the same

way as the starch when so heated was converted into sugar and dextrine, this salicine breaks up in a way which I might compare with that in which some bodies are broken up by fermentation.

Another case of the same kind is afforded by tannin, a substance extracted from gall-nuts, and which is present in oak and many other barks. It is used for combining with gelatine, which is the principal constituent in hides, to form leather. If we dissolve this tannin in water, and leave it in an open vessel, it will get mouldy; and if you examined it after some time you would find none of it left. It would all disappear, just like sugar in the process of fermentation, and in place of it you would find, in that particular process, a body which you might easily crystallize out from the liquid, and which I have here; it is called gallic acid. It is a body resembling tannin in some respects, for instance, in the property of forming, in combination with iron, a dark substance, which is used in suspension in water, for writing-ink. But it will not do to form leather in combination with gelatine. If you left the tannin in an open vessel, it would decompose, and there would be left gallic acid, and some other material which was formed at the same time would have disappeared. By boiling tannin with dilute acid, we get the process performed more regularly. Upon boiling some tannin with dilute sulphuric acid, you would find that water would be taken up by it, the tannin would combine with water, and it would break up into sugar and gallic acid, the process being exactly like that which I mentioned in the case of salicine. There is a most direct analogy between the process of breaking up which sulphuric acid effects upon tannin and that of fermentation. I ought to say, when telling you of the decomposition of the tannin, that it is effected by little animal organisms present in the liquid, and it appears that they are the agents of the transformation.

Then there are some other processes of considerable importance, from their occurrence in the animal economy—processes which I believe must be classed between those experiments which I showed you a little while ago and the process of fermentation,—I mean processes which occur in the operation of digestion. I have here a gelatinous solid, which contains a substance called pepsine,

which was made by dissolving the inner lining of a pig's stomach in diluted hydrochloric acid at about blood-heat. The inner lining of the stomach of that and similar animals is dissolved gradually, and that solution possesses the property of dissolving muscular fibre, white of egg, and other similar substances; it is, in fact, artificial gastric juice, and it would, for instance, dissolve that lump of gluten which I showed you just now—which looked something like india-rubber—and when this pepsine dissolves albumen by digestion, for the process is doubtless of the same kind as that which occurs in the animal economy, it does so by breaking it up into bodies which are no doubt simpler than itself, bodies which we do not know accurately and fully. They are called peptones, for it is common enough to gives names to bodies even before one knows them well. I do not know whether it is a good plan, but it is customary. These bodies are a good deal similar to those which are present in malt, and in such like mixtures, which have undergone vital changes.

Then I will give you one or two other cases of similar processes. Here is a singularly beautiful acid, called hippuric acid, which decomposes with very great readiness if left in the liquids in which it is originally found. When that organic mixture is exposed to the air, it undergoes a process of putrefaction. The general appearances which take place in the liquid while the substance is decomposing, would certainly be described by anybody as a putrefactive process, and there is formed by its decomposition some of this other beautiful acid, called benzoic acid, because it was originally obtained from the fragrant gum benzoin. At the same time there are other products given off which decompose. Now we can, by mineral substances, effect the same decomposition of that hippuric acid. A German chemist, to whom we owe many researches in these matters, showed, some years ago, that if you boiled hippuric acid with dilute sulphuric acid, it takes up water, and breaks up into benzoic acid, and this crystalline substance, called glycocol or sugar of glue. It got that name from the circumstance that it was obtained originally from glue by a decomposing action, and it has a sweet taste. It has no analogy to sugar in its nature, but it has that superficial resemblance that it is rather sweet.

This hippuric acid affords another case of a body which is broken up, either by putrefaction or by the action of dilute sulphuric acid. It affords a strong argument, and other cases I have adduced afford, like it, an argument that the action of these organic substances resembles the action of sulphuric acid. If we get the same change in several cases by the action of an organic body as by the action of a mineral body, the fact certainly goes some way toward showing that the two substances must be, in their mode of action, generally alike. There is another case, that of urea, which, in contact with water, forms a carbonate. That may be done by either class of re-agent.

There are, however, some chemical processes even simpler than these, and for that reason they are better known to us, which really may be studied with advantage, side by side with those I have mentioned, and they will, I think, afford us, on further consideration, a key to the explanation of these processes. I will only mention two. One is a process which is well known in its general features, and it is a process of breaking up, truly analagous to those I have mentioned, but a perfectly simple breaking up of alcohol into two substances, both of them well known now, one being water and the other ether. It is a process which consists in dividing the elements of alcohol in such a way as to get nothing formed but these two products, though side by side with this change there are some secondary changes which do not belong to the process. This change is effected solely by the action of oil of vitriol or sulphuric acid. It has been long known, and it was a subject of wonder for some time, that if sulphuric acid is mixed with alcohol and heated, you can distill off some alcohol from the mixture in the form of these two products; then you may add some more alcohol, and if you distill that off, it is also broken up into ether and water; then you may add some more again, and you may go on adding alcohol to that original quantity of sulphuric acid, and it will decompose each successive portion into these two products. There is no limit known to the extent to which sulphuric acid will effect that change. You perceive, therefore, that this, in its general features, is a process analagous to those which we were considering at first.

I may illustrate that by an experiment. First, I will show you how we discover the presence of sulphuric acid. The common test is, to add some salt of baryta — this which I have here is a chloride — to the sulphate, when we get at once a precipitate, sulphate of baryta. The sulphuric acid, in making the ether, passes over into a compound that does not possess this property. I have some of it here. It is a clear liquid, and on mixing it with the same re-agent I used just now, you see that it will not form the precipitate; I put some of the same baric chloride into it, but, as you see, the liquid remains clear. But I can bring back my sulphuric acid to its original state. Mr. Taylor, my assistant, was heating some of it just now, and it has been standing so long that it has returned to its original state already. It has returned from the state in which it does not precipitate baryta, to the state in which it does. There is in the process a successive departure of the sulphuric acid from its ordinary state, and a return to that original state; it is a kind of circle or cycle. The substance passes over into a compound which does not precipitate baryta, and then it returns again to its original form, and that is the key to the anomaly. When the sulphuric acid has effected the decomposition of one portion of alcohol into ether and water, it comes back again to sulphuric acid, becomes exactly what it was in the beginning, and is able to recommence precisely the same combination.

I will give you another illustration of it. I have here a substance used in one of the commonest manufactures, that of oil of vitriol, in which the same operation occurs. I have there a substance at work called nitric oxide. It is converting a quantity of sulphurous into sulphuric acid. In principle it would so convert an unlimited quantity, but in practice it is limited by convenience. It acts by carrying oxygen from the air to one portion of sulphurous acid, and then to another, and thus it goes on, and effects successive oxidations of a great number of particles of sulphurous acid, forming sulphuric acid from them, and it does that in virtue of a process perfectly analagous to that which I just now mentioned. The gas, after one operation, returns to the same state in which it was in the beginning of the first ope-

ration; it is a cyclical process. I have here some of the nitric oxide combined with oxygen, and when in that state it has the red color which you see in the flask. If we blow a little sulphurous acid into it, the red color will disappear as the nitrous acid gives up the oxygen, the nitric oxide itself being a colorless compound, but in combination with oxygen it is red. As the sulphurous acid passes into it, the nitric oxide parts with the oxygen and becomes colorless, but on again blowing in a little oxygen it returns to its former red color. This shows you that there are processes, of simple, normal, chemical action, somewhat analagous to those fermentive properties which I formerly described. Each one of these processes takes place in perfectly definite proportions, the peculiarity being that one material which takes part in them, returns at the end of one operation to the same state in which it was at the beginning of the operation, so that the processes are cyclical; and this re-agent is able, by acting successively on a large quantity of particles, to repeat its action very frequently upon them, and beyond what would appear to be its definite combining proportion. You see this red compound of nitric oxide and oxygen has lost a great deal of its red color. I will not wait until it is completely bleached, but will blow in a little oxygen, when we shall get a return to the original deep red color, This is the ordinary process by which sulphuric acid is made on a large scale in lead chambers. The sulphurous acid is allowed to remain a considerable time in the chamber, and is passed on from one to another, as it is acted on by the nitric oxide, which passes through the successive stages of its action by a process which I should be glad to name cyclical, as I shall have occasion again to revert to a similar process of the same name. At our next meeting I shall have to analyze some of the best known, and also some less familiar instances of cyclical action, that we may arrive at a conception of their nature.

(To be continued.)

Operative and Surgical Dentistry.

PLUGGING TEETH.

(*Continued from page* 147.)

Messrs. Jones, White & Co.:

Gentlemen:—I will now proceed to give a description of the instruments used in plugging teeth. But from the great variety of shapes and instruments in use for plugging, it would seem that no two dentists could adapt themselves with facility to the use of precisely the same kind of instruments; and that each should consider his own best suited to all, is not unnatural. That every dentist should be capable of adapting instruments to suit his taste, and peculiar method of operating, is necessary, because the shape of the instrument will much depend upon the position which the operator assumes in operating, the construction of his chair and manner most easy of approaching the patient. Therefore, we do not wish to be understood as urging our own as best suited to all, but we will give a numeral description of some of them, and in the order in which they should be applied in certain cases. Beginning first with those commonly used for plugging the front teeth on their approximal surfaces, and numbering them 1, 2, 3, etc., in the order in which they are to be used; so that if they are applied in this manner by the learner, he will produce a certain inevitable result.

No. 1 is bent near its extremity at an angle of about eighty degrees, and is curved upon itself laterally, so as form what are generally termed right and left pluggers. The curve should be sufficient to allow the point of the instrument to fall to the bottom of the cavity with facility, when rotating the shaft of the instrument on its axis, when entering and packing away the gold in the cavity, without the convex part of the instrument touching

the adjacent tooth. There should be larger and smaller sizes, to suit the size of the division between the teeth and the cavities. These instruments can be used to advantage in many parts of the mouth.

No. 2 is bent at an angle of about eighty-five degrees, about one-fourth of an inch from its extremity, but is flat and straight, with a kind of rib, or elevation running along the middle, which gives it the appearance of a flattened spear. But instead of it actually terminating in a spear point, it terminates flatly with an edge in the direction of the shaft of the instrument. This edge is slightly serrated to prevent it cutting the gold too much while packing.

No. 3 is bent at about the same angle as No. 1, and the one curved right and the other left, but instead of presenting a right and left flat surface, it presents an edge which is serrated, in order to better carry the gold into the cavity, and to require less force to produce the same effect upon the surface of the plug while packing, than a broader surface.

No. 4 is bent at an angle of about twenty degrees, more or less, to suit different cases, terminating nearly at an edge, which is also serrated. This instrument can be used for packing the gold along the lower boundaries of the cavities of the approximal surfaces of the superior front bicuspides, and some of the superior molars, when much decayed, or the facial cavities of the superior molars; but when bent at an angle of about eighty degrees, forming No. 5, it can be used for the inferior molars.

No. 6 is a strong, doubled-curved, flat, oval burnisher; each curve is at an angle of thirty degrees, and half an inch long; the last arm of the angle is slightly curved, so as to form a convex and concave surface laterally, making a right and left instrument; this instrument can be used with great facility upon the approximal surfaces of nearly all of the superior teeth, as well as some of the inferior, by resting the thumb of the right hand against the tooth which is being plugged, or one adjacent.

All instruments for packing a plug should be wedge-shaped,*

* The writer believes he was the first to apply the sharp wedge-shaped instrument for plugging teeth, having used them as early as 1838.

so as to pack laterally as well as downwards, and presenting as small a surface to the plug as possible, so that the greatest effect may be produced upon a given surface with a given power. The variety of instruments for packing and burnishing plugs, can be obtained at the instrument makers, generally, and their adaption to various positions and purposes must depend partly upon the ingenuity and judgment of the operator.

MANNER OF PREPARING THE GOLD.

When the cavity is prepared, and the instruments intended to be used for introducing the plug, are placed within convenient reach, then prepare the gold in such a manner as may be deemed proper for the case; say for a small sized lateral cavity, No. 4 gold, cut in strips, from one-fourth to one-half the breadth of the leaf—rolled, or folded and twisted to form a kind of rope, but not to be crimped so as to break the leaf in either way; on the contrary, it should present as smooth an appearance as possible. Some suppose, the more roughly the rope is twisted, the better one fold, when put in the cavity, will hold upon another. But not so; besides, it makes a porous plug, and when the leaf is much crimped and broken, it cannot be rendered solid without immense pressure: again, it will not receive a fine polish, as small particles will constantly burnish off.

For facial cavities, No. 6 is, perhaps, best, prepared in a similar manner as described above, as it makes a stronger plug, and there is better opportunity for applying more pressure in packing in such cases. Where a facial cavity is large, a leaf of No. 4, folded over a piece of watch-spring, or thin burnished steel, of about an eighth of an inch wide, in the form of a tape, which folded again upon itself, so as to form a kind of block, as many of which as may be desired, may be placed in the bottom of the cavity, and firmly packed. The gold being folded smoothly in this way, is already nearly as solid as it can well be made, and very little pressure is required to render it entirely so. A deep cavity partially filled, so as to make it shallow, is desirable, which can then be finished with the rope in the usual way. This kind of block, nicely folded, is indispensable and invaluable for building

up the broken-down sides of cavities, or placing along the gum of any large cavity, because the dampness cannot permeate it, as well as the gold rolled in the ordinary manner, and in filling and finishing, it will not crumble away. It should be our constant study to put the gold in such a condition before introducing it into the cavity, as to be rendered solid with the least possible pressure and in the shortest space of time. In introducing the gold into a shallow cavity, say a little deeper than the enamel, one end of the rope should be placed firmly against one side, and bottom of the cavity opposite the point at which we intend to finish. Then catching the roll outside of the cavity, and folding it upon itself with the instrument, and carrying that point down to the bottom of the cavity, also, leaving a knuckle a little without the orifice. This continued alternately, and pushing the one fold against the other powerfully, until the cavity is filled, using for the last one or two folds, a small instrument. This can commonly be accomplished in the cavities of the front teeth with No. 1 instrument. Now, these knuckles, or convolutions, may be projecting in the cavities of the approximal surfaces against the adjacent teeth, so as to prevent getting fairly upon them with the same instrument; if so, use No. 2, which, being sharp at the edge, and wedge-shaped, will enter between the plugs and the adjacent tooth without displacing the gold from its previous fixed position, and compress the plug sufficiently to admit of applying the sharp right and left packers, No. 3, with which the plugs can be completely packed. The same method, precisely, is adopted in introducing the gold into the facial cavities of the superior and inferior molars, using No. 4 for the superior, and No. 5, 2 and 3, as the case may be, for the inferior; and for packing the gold of either jaw, use the ordinary packers, for back teeth, with small points slightly serrated, to prevent slipping. Now, it is exceedingly important that the gold and the cavity should be kept perfectly dry during all this part of the operation, and in the front teeth especially, because the dampness will prevent the fresh dry surfaces of the gold and cavity from adhering well.

If the saliva gets in, it cannot be entirely pressed out, however powerful the pressure may be, because the hardening of the gold

upon the surface of the plug, will close up the pores there and prevent the water from escaping from those below; besides, it will undergo chemical change, and discolor the tooth and plug. Various contrivances have been resorted to by different operators, for this purpose: Desaborde's tongue holder, for depressing the tongue, and Lawrence's, which is for a similar purpose, and very useful. Some, also, use a kind of truss, with one pad under the chin and one on the tongue. Even the syphon has been applied to draw the saliva from the mouth. A very simple contrivance of mine, whilst operating on the lower teeth, is to fold a piece of muslin around a light watch-spring, about two and a half to three inches long, as the case may require, sufficient to make a roll about as thick as the little finger, and place it around the jaw, between the tongue and margin of the gum. This not only absorbs the saliva, but compresses the sublingual and maxillary ducts, and prevents its rapid secretion, and the elasticity of the spring forces the roll against the gum, and prevents the saliva from flowing between the teeth while operating upon their approximal surfaces, as well as any other part of them. And as the back teeth of the inferior maxillary commonly incline a little inwards, they favor the retention of it in position. If, at the same time, a roll of cotton, lint, or napkin be placed between the cheek and the superior teeth, to absorb the saliva there, as well as to compress the stenonion duct, and an additional roll compressed between the inferior teeth and cheek, a complete state of dryness can be maintained long enough to accomplish the operation of plugging any of the inferior teeth, back or front. For protecting the back teeth of the superior maxillary, placing a roll of cotton, or muslin, between the gum and cheek, is frequently sufficient, but when saliva comes in the way from the patient involuntarily touching it with the tongue, apply the tongue holder, or roll a napkin into a ball, and place it between the roof of the mouth and tongue. A plan which we practise a great deal in operating upon the front teeth, — as it not only keeps the tongue down but prevents the breath from dampening the gold or cavity, at the same time that this is applied, for the front teeth — is to place a thin roll of muslin between the lip and gum. This will suffice for general directions, but each

operator must exercise his judgment in adapting an expedient for special cases. For drying the cavity, some prefer lint, others cotton, paper, tape, &c. We use tape or cotton, as the case may be, forced in hard enough to absorb the principal part of the dampness, and depend upon scraping the cavity dry, as that process leaves a fresh surface, to which the gold best adheres. After the gold is well packed in the cavities, file and scrape the rough surface of the plug, pack and burnish alternately, with a smooth instrument, until the surface is level or flush with the margin of the cavity, always having filled the cavity full enough to admit of this without reducing it below the margin. Very frequently we do not file the tooth as much as we ultimately intend it shall be, that after the plug is packed we may file the tooth so as to be sure that the plug and margin of the cavity shall be perfectly flush, unless it be in some few cases where it is desirable to have the plug to project above the surface of the cavity, but in all cases, the marks of the instruments should be filed out of the surface of the plug. After this is accomplished, use between the front teeth, emery paper, or pumice, finely powdered, rotten-stone and rouge,* and burnishing alternately, until the surface is as perfect, and dense, and mirror-like, as a well polished gold plate. It is indispensable that the surface of the plug shall be impervious to air and dampness, and not lose particles of gold by brushing, or during mastication. The Scotch stone of the jewelers can be used with advantage in many cases, in dressing the surface of the plug, previously to the use of the rouge, but all those substances must be well cleaned off the surface of the plug before using a burnisher, as they will injure the instrument and prevent the production of a perfect polish. For filling a nerveless tooth, we are in the habit of rolling a piece of heavy gold-leaf into a solid and pointed roll, which can be done by cutting the leaf into a point and passing this down the roots of the tooth as a flexible wire, and then following it with a small plugger, especially for that purpose, adding more gold until the nerve cavity is com-

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*Those three last named articles can be applied either with a piece of tape or hickory wood.

pletely filled, and lastly, burnishing this surface as hard as the filling of the external cavity.

Believing, gentlemen, that I have said sufficient to direct the young learner in the general operations of plugging, I will conclude by thanking you for the flattering manner in which you have been pleased to receive this short series of papers, regretting that they are not as deserving as I could have wished them to be, which has resulted from a want of as much time as I had originally intended to devote to them,

I remain, yours truly,

J. D. White.

LUXATED TEETH.

Having seen some suggestions with reference to the subject of which the heading is an index, we have taken some pains to look up a case we had here.

About January, 1868, Mr. L. came to our office, suffering intensely with toothache, and would submit to no extended examination, but put his finger upon the first upper left molar, and requested extraction without delay. We extracted the tooth, which had a small cavity upon the anterior proximal surface, otherwise healthy, and had three large and divergent roots. About fifteen or twenty minutes elapsed, with patient still having toothache as severely as ever. Requested another tooth extracted. Upon a little examination we found the second upper bicuspid of the same side badly decayed upon the posterior approximal surface, nerve exposed, and of course aching. Patient not appreciating teeth very highly, would have nothing done but "pull." We therefore pulled *it* out.

The molar that lay upon the table being too good a tooth to be lost, we, with the consent of the patient, washed out the socket with *cold* water, and washed the tooth in *cold* water, and with something of an effort replanted the tooth, adjusted a compress, and dismissed, requesting the patient to call in a few days. In about one week we saw the case, found tooth firm with a little

inflammation. Scarified *lightly* and dressed with tinct. aconite, and dismissed the case. We have several times since seen the case, and were glad to learn that the tooth had never given any trouble. The last time we saw the patient, he quietly informed us that he was "chewing all his tobacco upon it." The treatment of this case differs from some, if not all we have seen reported, by washing with *cold* water. We thought this: if intense cold will reduce inflammation, perhaps it will prevent some. Was it prudent practise?

One other case that we have seen but recently. A young man of our acquaintance, of perhaps twenty-three years, was skating, and receiving a fall, knocked out the upper central incisors. He picked them up and held them in his hand a few moments and then replaced them, and to his great joy they have become serviceable teeth. When we saw them a few days since they were all right with the exception of a little irregularity, which he attributes to blowing a horn. He was, at the time of the accident, the leader of a cornet band, and continued to perform his duty.

We have not attempted to cure an abscess by extracting the tooth, removing the sac, and cutting off the apex of fangs, and then replacing, but should like to hear from those who have.

KIRKSVILLE, MO. SQUIBS.

ALVEOLAR ABSCESS AND CARIES.

CASE.—April 10.—*Mrs. H., age* 35, *Brunette.*

The left upper central incisor was plugged fifteen years ago. Pulp removed and root filled. Has had chronic pericementitis several years; the pus exuding in front of the *right* central about half way between its gingival border and the end of its root. This formation and exit of pus has never given pain, and has continued for four or five years.

About two years since Mrs. H. had a rubber plate inserted to supply some vacancies in the bicuspid region, since which time

pressure on the palatine arch, corresponding to the location caused by the *suction cavity* in the plate, would cause a free flow of purulent matter from the fistulous opening. This having rather increased of late, the patient consulted me.

Present Condition.— Offensive purulent discharge from fistulous opening in front of the root of the right upper central incisor. A slight swelling in the palate corresponding to the suction cavity of the plate already mentioned. No inflammation of the gum over the swelling. No pain. The left central incisor very loose, with a good looking plug on mesial surface.

Patient complains of the insufferable stench coming from the purulent exudate.

Diagnosis.— Alveolar abscess, with possibly caries of the palate bones.

Treatment.— Pressing upon the swelling, a great spoonful of purulent matter exudes from the labial fistula.

I cut into this fistula, enlarging the opening through the gum. Finding the alveolar plate over this healthy right incisor in a sound condition, with only a small opening through it, I cut away some of the bone and make the canal, for a short distance, as large as a No. 12 burr drill, carrying the latter as far as the diseased tooth, *left* incisor.

The palatine swelling is now cut into, making a gash one-fourth of an inch long. A large quantity of purulent matter escapes here, notwithstanding the quantity that had just been forced through the labial orifice.

Exploration through the wound reveals an immense cavity in the bone itself; between the nares and this cavity, over an area of half an inch square, there was no bone. There was no necrosed bone to be found, or at *present* carious bone of any extent. If this loss of bone was caused by caries, the caries, I think, was circumscribed by the present opening, and was only extending slowly and continuously, and the bone adjacent to the lost portion was carious only on its margin.

I resolved on thorough treatment, and having had two similar cases before, terminating successfully, I fully expected it in this case; and especially as the patient was thoroughly healthy at

present, with an excellent *constitution;* to the latter, undoubtedly, she owed the limitation of the disease.

The cavity was thoroughly syringed out with warm water five or six times, and water forced from the palatine opening through the labial one. When apparently thoroughly cleansed, a half ounce of *crude* kreosote was thrown into the cavity through the palatal opening, the mouth being thoroughly protected from the effects of the kreosote which might escape; the soft tissues of the palate being wiped dry and then painted with sweet oil, and the same being done with the lips and cheeks. The lips and tongue were moreover protected by a sheet of thin rubber. As no kreosote escaped by the labial fistula, I threw fifteen or twenty drops of that fluid into the latter opening.

About half of the kreosote injected into these cavities remained there while the patient remained in the office.

I now took two inches of floss silk wet in kreosote and forced it into the labial canal as far as possible, leaving just an end projecting. About two inches of linen tape, three-sixteenths of an inch wide, was used in the same manner in the palatine cavity.

Patient was now dismissed, to call next day, and with the assurance of considerable inflammation and pain in the parts during the next twelve hours.

Next day patient appeared. Had suffered much since yesterday, but was in no pain at present; only a *soreness* about the palatine opening. Patient dismissed without further treatment, except to call every day or two and have the projecting silk and tape cut off as they were forced outward, by the filling up of the cavities by plastic material. At the end of four days these were entirely removed in this way.

Patient forbidden to use the rubber plate at present.

In four or five days the external opening had healed and appeared healthy. The diseased incisor had become firmly fixed in its socket.

The swelling in the palatine arch had subsided to a natural condition.

I write May 2d, and since writing the above, have just examined the patient. There is every appearance of health in the parts.

She states that there was severe inflammation and a "gum boil" immediately following the filling of the root, fifteen years ago.

There are some very interesting speculations connected with this case, which each one can make for himself, as this article is already long enough. CHASE.

Mechanical and Miscellaneous Department.

THE DENTAL OFFICE.

"Your office is very pleasant, but your profession *horrid!*" was the remark of one who came into my office seeking professional services a short time since. Such and similar exclamations, the members of our profession are greeted with almost daily. As far as my experience extends among the masses of the people, there exists in the majority a mortal fear and dread of all dental operations—more especially that of extraction of teeth, participated in alike by old and young, male and female, and oftentimes even from those whom we would the least suspect.

Among *men* we naturally look for *courage*, and strength of nerve sufficient to endure the extraction of a tooth; yet few there be who possess either. Well do I remember an instance in my own practice, of one, who, when our country was in danger, was among the first to answer her call, and in the "tented field" he engaged in the terrible scenes of war with unwavering courage until the dawn of peace, gaining the encomium of all as one of "the bravest of the brave," yet with the tortures of toothache and the painful remembrance of a former extraction, attended by the most revolting display of *bloody* and *rusty* instruments, suffered untold agony for weeks before he could be induced to have the offending member removed.

First impressions influence greatly; and if for this reason only, we should strive to make our offices as attractive and comfortable as possible. Our patients will most certainly appreciate every endeavor in that direction. Cleanliness and neatness in the operating room, instruments, and of the person, are of the highest importance. Bloody instruments, napkins, spittoons, etc., are often seen in the office when there is no excuse whatever for their appearance. Cleaning and extracting teeth are not very pleasant or cleanly operations at the best, yet by practice and care, can be performed so as to omit all that which is disgusting to the mind of the sensitive patient.

These thoughts suggested themselves upon entering lately an office having a large practice, yet which abounded with everything to disgust in the way of uncleanliness, perhaps wholly unnecessary to the great majority of the profession, as I hope; yet it will never do any harm to ever keep before us the *necessity* and *duty* we owe to our patients, not only to do all our operations as well as we possibly can, aiming at perfection, but to exercise the greatest care in keeping our offices *models of neatness.*

P. E. WHITE.

DAVENPORT, IOWA, April 11, 1871.

BURRING ENGINES.

We notice the following in the November No. of the *Transactions of the Odontological Society of Great Britain.*

Mr. HARRINGTON exhibited a machine to supersede the use of the hand drill. He said the principle of the machine first suggested itself to his mind some eighteen years since; after almost innumerable attempts, he succeeded in making it available for practice. About five years ago he had the pleasure of exhibiting one before the members of the Society, and very naturally, as the inventor of the machine, he flattered himself it would have been adopted by the profession, but in this he was disappointed. The chief objection to its use being that it was too noisy when in

operation; he was bound, however, to say that, in his own practice, he had never met with any complaint from his patients on this score. Being anxious that his professional brethren might avail themselves of his invention, he had turned his attention to subduing the noise complained of, in which he had completely succeeded. The rapidity with which it worked would render it of great value to men in large practice; he calculated he could do as much in ten minutes with it as, with the ordinary hand drill, he could accomplish in one hour, and at the same time with much less discomfort to the patient. It would be found principally valuable in two classes of cases—one where the lines of decay ran in a cruciform manner along the grinding surface of molar teeth; these cases were too often but imperfectly stopped, owing to the difficulty of opening up the decayed line, but which could be effected with the machine under consideration in a few minutes,—the other, where it was found necessary to remove an amalgam stopping. Mr. Harrington illustrated, before the Society, the rapidity with which a stopping could be removed. The machine could be kept perfectly under control while in use, by the thumb of the operator, and its speed could be regulated with the greatest nicety, or it could be instantly stopped. With one winding it would work for two minutes. The present machine was superior to the former, not only from its noiselessness, but from the superior material of which it was made.

Mr. Fox said, as he had, through the courtesy of Mr. Harrington, had the opportunity of thoroughly testing the capabilities of the machine, he felt bound to give the result of his experience with it, which might be briefly summed up in the remark that, having used it for some months, he should be sorry ever to be without it again. Like everything else, it takes a little time to get accustomed to it. When once the first difficulty is overcome, it becomes invaluable in the operating-room. The apparent cumbersomeness disappears after a little practise, the very weight of the machine being an aid in the drilling. A hand drill only cuts on the half-turn forwards; during the back turn no advance is made; but with this instrument you cut all the time it revolves. Although the silent form was best, he did not find patients ob-

ject to the noisy one—they invariably prefer it to the hand drill, as being far more expeditious, but, in fact, he had always found that patients would believe in what you believed in yourself.

The machine is wound up the same as a clock, and should never be allowed to run down without being checked by placing the thumb on the guide wheel.

LINES UPON A SKULL.

Behold this ruin! 'Twas a skull,
Once of ethereal spirit full.
This narrow cell was life's retreat;
This space was thought's mysterious seat.
What beauteous visions filled this spot—
What dreams of pleasure long forgot?
Nor Hope, nor Joy, nor Love, nor Fear,
Have left one trace of record here.

Beneath this mouldering canopy
Once shone the bright and busy eye.
But start not at the dismal void—
If social love that eye employed;
If with no lawless fire it gleamed,
But through the dews of kindness beamed,
That eye shall be forever bright,
When stars and sun are sunk in night.

Within this hollow cavern hung
The ready, swift, and tuneful tongue;
If Falsehood's honey it disdained,
And when it could not praise, was chained;
If bold in Virtue's cause it spoke,
Yet gentle concord never broke,
This silent tongue shall plead for thee,
When Time unveils Eternity.

Say, did these fingers delve the mine:
Or, with the envied rubies shine?
To hew the rock, or wear the gem,
Can little now avail to them.
But if the page of Truth it sought,
Or comfort to the mourner brought,
These hands a richer mead shall claim
Than all that wait on Wealth or Fame.

Avails it whether bare or shod,
These feet the paths of duty trod;
If from the bowers of ease they fled
To seek Afflictions humble shed;
If Grandeur's guilty bribe they spurned,
And home to Virtue's cot returned,
These feet with angel wings shall vie,
And tread the palace of the sky.

THE WABASH VALLEY DENTAL ASSOCIATION.

The Wabash Valley Dental Association convened in the city of Lafayette, in the rooms of the Young Mens Christian Association, at 10 o'clock, A. M., March 21, 1871, President John L. Scott in the chair.

The following members responded to the calling of the roll: A. B. Cunningham, Attica; J. L. Scott, Defiance, Ohio; J. S. Snoddy, Lafayette; W. F. Lewis, Delphi; Isaac Knapp, Fort Wayne; A. M. Moore, Lafayette; W. H. Pifer, Lafayette; Lewis Jourdan, Delphi; E. V. Burt, Lafayette; I. W. Fahnstock, Lafayette; Senaca B. Brown, Fort Wayne.

Minutes of the meeting of 1870 were read and approved.

The Treasurer, J. S. Snoddy, made his report; action was deferred till afternoon session.

The Board of Censors being absent, the Chair appointed Drs. A. B. Cunningham, A. M. Moore and Isaac Knapp, in their stead. The Board recommended Dr. E. Snider as a candidate

for membership. The rules being suspended, he was declared a member of the Association.

Dr. E. V. Burt moved that Professor Chase of St. Louis, Dr. P. G. C. Hunt, of Indianapolis, Dr. C. Palmer, of Warren. O., and Dr. Will. Taft, of Cincinnati, O., be elected honorary members. Adopted.

The election of officers for the ensuing year resulted as follows:

President, A. B. Cunningham, of Attica.
First Vice President, Evan Snider, of Fort Wayne.
Second Vice President, W. F. Lewis, of Delphi.
Secretary, Senaca B. Brown, Fort Wayne.
Treasurer, A. M. Moore, of Lafayette.

Dr. Burt moved to adjourn till 2 o'clock, P. M.

Dr. Moore moved to dispense with the motion to adjourn, to vote for S. P. Thompson, a candidate for membership. Adopted. The rules being dispensed with, Dr. Thompson was declared a member.

Adjourned to meet at 2 o'clock, P. M.

First Day—Afternoon Session.

The Association met at 2 o'clock, pursuant to adjournment, Dr. Cunningham, the newly elected President, in the Chair.

Dr. Moore presented the name of W. P. Crowell, who was unanimously elected a member.

The first subject for discussion, "Filling Teeth with Heavy and Light Mallet," being in order, Professor Moore made some remarks in favor of the heavy mallet.

Professor Chase, of St. Louis, stated his experience with mallets of different weight, and concluded that from three or four years' experience, a seven or eight ounce mallet is preferable.

Dr. Hunt next spoke in favor of the heavy mallet.

Dr. Taft uses a six ounce lead mallet.

Dr. Knapp, like others, has gone through the various kinds, and now believes lead the best.

Dr. Snider uses exclusively the elastic wooden mallet.

Drs. Palmer, Scott, Burt, and others, all spoke in advocacy of

the heavy mallet, when, on motion, the second subject, viz: "Materials for Filling Teeth," was taken up.

Dr. Knapp uses Watt's foil, Nos. 3, 4, 10, 20, 30 and 60—makes the main part of the filling with No. 4.

Dr. Hunt uses oxychloride of zinc, cement, amalgam and Johnson's Nos. 4 and 60 soft foil, principally No. 60.

Dr. Palmer uses gold, tin, Hill's stopping, oxychloride—*nothing else.* Tin always for children.

Professor Chase advocates tin in place of amalgam, in all approximal cavities, and gold for most cases. No. 4 to 6 adhesive, No. 4 to 8 soft foil (Abbeys). In building up, 20 to 60.

Professor Moore advocates gold, and thinks next to that comes cement Plombe; thinks it far superior to oxychloride; after six months trial the surface of the cement presents a good condition and polished.

The discussion on this subject was here closed, and, on motion, the third, viz: "Expediency of building up Cutting Surfaces of Incisors when worn away by mastication," was taken up.

Professor Moore stated a case contemplated in the question, and as he had adopted the practise, wished to ask the views of other members.

Dr. Hunt gave a case of an elaborate and interesting character, that resulted very satisfactorily to himself and the patient.

On motion, adjourned to meet at half-past 7 o'clock, P. M.

First Day—Evening Session.

Association met at 7½ o'clock, President Cunningham in the Chair.

Minutes of afternoon session read and approved.

Dr. Knapp spoke upon the subject in order, and gave an account of successful practise with him.

Professor Chase spoke in approving terms of this practise.

Dr. Palmer also gave interesting accounts of cases in his practice, and continued at length with a full description of the modus operandi, kinds of foil, etc.

On motion of Professor Moore, the subject under discussion was dispensed with, and the Association adjourned to meet at the

dental apartments of Drs. Moore & Burt, at 8½ o'clock, A. M., on Wednesday morning, when the regular order of business will be suspended, and the morning be devoted to clinics.

Second Day—Morning Session.

Met according to adjournment at the rooms of Drs. Moore & Burt, at 8½ o'clock.

The entire morning was occupied by Professor Chase in clinics, much to the profit of all.

Second Day—Afternoon Session.

Association met at the regular place at 2 o'clock, P. M., President Cunningham in the Chair.

On motion, the reading of the minutes was dispensed with.

On motion, the regular order of business was dispensed with, and Dr. Palmer invited to occupy the afternoon in exhibiting and explaining his casts, charts and diagrams, which he accordingly did, holding the Association in the closest attention for the entire afternoon. The lessons learned from him are what none can afford to lose.

On motion, a vote of thanks was tendered to Drs. Palmer and Chase, for their kindness in visiting us, and contributing so much to the interest of our meeting.

The Association adjourned to meet in the city of Fort Wayne, on the 3d Tuesday of March, 1872.

Senaca B. Brown, Sec'y.

CALIFORNIA STATE DENTAL SOCIETY.

Office of the Recording Secretary,
Woodland, Cal., April 10, 1870.

Editors Missouri Dental Journal:

Be kind enough to notice in your next number, that our second annual session will be held in San Francisco, commencing June 6, 1871.

We expect a highly interesting session, and that our proceedings will be creditable and beneficial to the profession generally.

Invitation has been extended to every member of the profession on the Pacific coast, to be present.

H. J. PLOMTEAUX, Rec. Sec.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

OFFICE CORRESPONDING SECRETARY,
SOUTH CAROLINA STATE DENTAL ASSOCIATION,
CHARLESTON, April 26, 1871.

At the anniversary meeting of the South Carolina State Dental Association, held in this city on the 10th, 11th and 12th inst., the following gentlemen were elected to serve for the ensuing year:

Wm. C. Wardlaw, Abbeville, S. C., President.
Thos. T. Moore, Columbia, S. C., 1st Vice President.
B. A. MacRenfuss, Charleston, S. C., 2d Vice President.
Theodore F. Chupein, Charleston, S. C., Cor. Secretary.
O. P. Bond, Macon, S. C., Recording Secretary.
W. T. Brown, Charleston, S. C., Treasurer.

THEODORE F. CHUPEIN,
Corresponding Secretary.

CHICAGO DENTAL SOCIETY.

CHICAGO, April 20, 1871.

Editors Missouri Dental Journal:

At the annual meeting of the Chicago Dental Society, held April 3d, 1871, the following officers were elected for the ensuing year:

President, Dr. George H. Cushing; 1st Vice President, Dr. M. S. Dean; 2d Vice President, Dr. J. N. Crouse; Recording

and Corresponding Secretary, Dr. E. D. Swain; Treasurer, Dr. Wm. Albaugh; Librarian, J. S. Marsh; Executive Committee, Drs. M. S. Dean, C. R. E. Koch, and J. M. Crouse.

E. D. Swain,
Secretary Chicago Dental Society.

ELECTRICAL PLUGGER.

From a letter recently received from Dr. Caulk, of Philadelphia, we learn that he may be expected to be present at the meetings of the State Societies of Illinois, Missouri and Indiana, for the purpose of exhibiting Dr. Bonnill's "Electrical Plugger." We have before called attention to the fact that Dr. B. was at work upon this instrument, which the profession are soon to have the pleasure of seeing in operation. We know nothing of its merits except from hearsay, and reserve what ever we may have to say respecting it, till we have seen and tried it. E.

NEURALGIA.

A correspondent of the *Lancet* says:—"A few years ago, when in China, I became acquainted with the fact, of the natives, when suffering with facial neuralgia, using oil of peppermint, which they lightly applied to the seat of pain with a camel-hair pencil. Since then, in my own practice, I frequently employ this oil as a local anæsthetic, not only in neuralgia, but also in gout, with remarkably good results."

[We recently had a patient in our office, who, while in China a few years since, observing the general good results from the use of the above remedy in cases of neuralgia, brought a quantity away with him. On the voyage home, one of the sailors had a severe attack of inflammatory rheumatism, which deprived him

of the use of one of his arms; by two or three applications of the Chinese remedy, he was entirely relieved in twelve hours. On reaching home, our patient distributed this great panacea among his friends, and he assured us they had used it with happy effect, in cases of neuralgia, pain in the head, or limbs, and rheumatism.—Ed.]

JOURNALISTIC.

The *American Journal* for April has an article, translated from the German, upon inflammation of the dental pulp. The article was written by Prof. Dr. C. Wedl, and first published in the *Deutsche Vierteljahrschrift.*

It deals mainly with the microscropic appearances presented in inflammations, chronic and acute, of the pulp, and shows unmistakable evidence of careful research and investigation. The translation, however, is far from being what it should be, and if we did not keep this fact in mind, we might be induced to do injustice, in making up our opinion in regard to its value, to the distinguished author himself. Among other interesting experiments, Professor Wedl instituted several in order the determine whether coloring matter would penetrate through the cementum or discolor the dentine.

This question may be authoritatively answered in the negative, as far as the various substances employed by the author is concerned, whilst it was shown that the dentine was easily colored when the same substances, *i.e.*, carmine, alizarine, Berlin blue, blood red, etc., were introduced into the pulp cavity. Many points of interest are discussed in this article that we have not time to notice further.

The next article, by J. H. Foster, M. D., which was read before the "American Acadamy of Dental Science," contains some doctrinal points, which merit a moment's consideration.

The article is headed, "Professional Shortcomings," and proceeds as follows: "First and foremost in the sins of omission, then, may be classed that of an unhealthy condition of the mucous membrane of the mouth."

We do not exactly see the propriety of classing "an unhealthy condition of the mucous membrane of the mouth," among the "sins of omission," although we might class among such sins, a *neglect* of duty on our part, through which such a state or condition might result; but we notice this article principally for the purpose of entering our protest against a practice advocated with much earnestness, but as I conceive, without any valid reason for so doing, *i.e.*, the extraction of the six year old molars.

All that is said in relation to the shortening of the jaws in the Anglo-saxon race, needs confirmation before we make important changes in dental practice, based upon such a supposition.

The six year old molars should be treated upon the same principles as any other teeth. They are in very many cases as capable of resisting morbid influences, as any other teeth, and if in many cases they decay before the second molars, we must remember that they are nearly six years older than the second molars, and having been exposed to the influence of morbific agents five or six years longer than the *twelve* year molars, it is not strange that they should show symptoms of decay before the others. Let the first molars be persistently extracted early for a few generations, and we might then well expect a shortening of the jaws as a hereditary deformity, and the best way to combat such a tendency, if it did exist, would be to save with scrupulous care the six year old molars. Some of the admonitions, however, found in this article are important and well worthy of attention.

Article fourth, upon "The Patent Flexible Edge," from the *Canada Journal*, is a sensible article, the writer coming to the conclusion, evidently, that it will not be much of an acquisition in practice. It is well known to those who have used soft rubber in the construction of obturators, that it is not durable in the mouth, and it has been claimed by many that a soft rubber rim has been used occasionally, for many years, by various members of the profession. It is undoubtedly true that many patents are obtained by those who had nothing to do with with the invention at all, but who have stolen some idea from some one else, and obtained a patent, from which they hope to fleece those who are willing to labor for a living, out of their honest earnings.

Now the people in the United States pay more money for patents every year than they pay for interest on the public debt, three-fourths of which, at least, goes to enrich certain cliques, which control the business, manage to get extensions from Congress, etc., and whilst half of the time of Congress is taken up in devising means to lessen the interest on the public debt, this monstrous swindle is left untouched.

The *Boston Journal of Chemistry*, which ought to be in every family in the United States, has an editorial upon "The Spread of Darwinism," in which it quotes from his recent book, "The Descent of Man," as follows:

"The early progenitors of man were no doubt once covered with hair, both sexes having beards; their ears were pointed and capable of movement; and their bodies were provided with a tail, having the proper muscles. Their limbs and bodies were also acted on by many muscles which now only occasionally reappear, but are normally present in the quadrumana."

* * * * * * * *

"In the class of the mammals the steps are not difficult to conceive, which led from the ancient Monotremata to the ancient Marsupials, and from these to the early progenitors of the placental mammals. We may thus ascend to the Lemuridæ; and the interval is not wide from these to the Simiadæ. The Simiadæ then branched off into two great stems, the New World and Old World monkeys; and from the latter, at a remote period, man, the wonder and glory of the universe, proceeded."

The editor of the *Journal*, however—although he acknowledges that the doctrines of Darwin, upon the origin of the species, is accepted, as in the main, correct, by the great body of German naturalists, as well as by a great many in England and in this country—is not yet well satisfied with the reasonings through which he reaches his conclusions. It is evident, however, from the whole tone of the editorial upon the subject, that the *Boston Journal* will not make any serious effort to disprove the Darwinian doctrine, inasmuch as he takes considerable pains to harmonize this theory with that which claims that species were created by the direct agency of the Divine Mind.

In the *Boston Medical and Surgical Journal*, of April 27th, we have the outlines given of the new course of study hereafter to be pursued at the medical department of Harvard University.

Anything which will tend to systematize and improve the course of study in our medical colleges, will be hailed by the great mass of intelligent practitioners as a boon to the medical profession.

The system as determined upon by the Harvard school may not be perfect, but it seems at first sight to promise something better than the heterodox conglomerations that are presented by many of our medical colleges at the present day, and which are supposed to constitute a medical course of teaching.

Hereafter at this school, "The course of study will be as follows:—

"For the first year—Anatomy, Physiology and general Chemistry.

"For the second year—Medical Chemistry, Materia Medica, Pathological Anatomy, Theory and Practice of Medicine, Clinical Medicine, Surgery and Clinical Surgery.

"For the third year—Pathological Anatomy, Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery and Clinical Surgery."

Three years constitute a full course, but one may enter the second or third class, if he be able to pass a satisfactory examination in those branches assigned to the first and second classes.

It is to be hoped that this step taken by the Harvard school, will prove to be the dawn of a better day for the medical profession.

On page 259 of the same journal, we find a report of cases of whooping-cough, treated by spraying the throat with the following mixture:

℞. Ext. belladon. fld. gtts. v. to x.; Potassæ bromid. ℈j.; Ammoniæ bromid. ℈ij.; Aquæ distillatæ ℥ij. M. Ft. solutio.

Use a table-spoonful once a day, making the child cry whilst spraying the throat, in order that the medicine may be drawn deeply into the lungs during the respiration.

The *Dental Register*, for April, has for its first article the address of Dr. F. H. Rehwinkle to the graduating class of the Ohio Dental College. In the course of the address the Doctor makes use of the following language:

"As a specialty of medicine and surgery, operative dentistry involves a necessity for a general knowledge of the whole science of the healing art." The world moves! The address is creditable to its author.

In the reports of the Mississippi Valley Association, the subjects of heavy mallets, heavy and light foils, sensitive dentine, etc., are discussed, but we do not notice anything differing materially from what has frequently been laid before the readers of the JOURNAL, so that we desist from giving lengthy extracts. J.

OBITUARY.

CHICAGO, April 20, 1871.

Editors Missouri Dental Journal:

SIRS—In sending, this A. M., the report of the election of officers, I neglected to enclose, as per instructions, the following preamble and resolutions, relative to the death of Professor Peebles:

Whereas, The members of the Chicago Dental Society have learned with deep sorrow, that Divine Providence, in his inscrutable ways, has seen fit to remove by death, Professor Peebles, of St. Louis; and

Whereas, Prof. H. E. Peebles, by his devotion to the interests of his profession, and particularly by his zealous and assiduous efforts for the promotion of dental education, has accomplished much to secure the advancement and honor of dentistry; and

Whereas, The professional character of the deceased was such as to command the love and respect of his professional brethren at large; therefore,

Resolved, That in the death of Professor Peebles, the dental profession has been deprived of one of its most active, efficient and honorable members.

Resolved, That we, the members of the Chicago Dental Society, deplore the greivous loss which the family have sustained, and cordially sympathize with them in their great bereavement.

Resolved, That the Corresponding Secretary be instructed to forward a copy of these resolutions to Mrs. H. E. Peebles, and to furnish a copy of the same to the MISSOURI DENTAL JOURNAL.

E. D. SWAIN,
Cor. and Rec. Sec., Chicago Dental Society.

MISSOURI STATE DENTAL SOCIETY.

The Missouri State Dental Society will meet in the city of Saint Louis on the first Tuesday in June, 1871.

The following essayists were appointed at the last annual meeting:

Dr. Judd, Histology.
Dr. Eames, Chemistry of the Saliva.
Dr. Goodrich, Treatment of Alveolar Abscess.
Dr. Forbes, Irregularity of the Teeth.
Dr. Black, General Pathology in its relations to Filling Teeth.
Dr. Park, Contour Fillings.
Dr. Porre, Gold Foils.

Discussions will be had on the above subjects, and also in relation to MECHANICAL DENTISTRY, great improvements in which have been made during the past year.

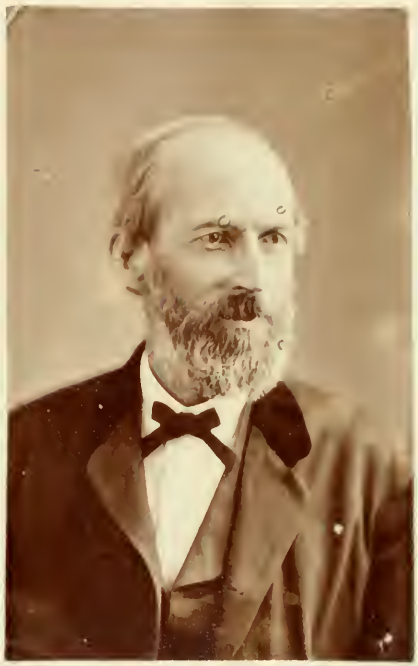
Specimens of Dentures, "put up" on several new and improved bases, will be exhibited, and the necessary manipulations for their manufacture fully explained.

The new burring machine of Dr. Morrison will also be on exhibition, as well as several other new or improved instruments, both in Operative and Mechanical Dentistry

Altogether, this promises to be one of the most interesting and instructive meetings which have ever been held by this Society.

N. B —It is expected that arrangements will be made to entertain Dentists from abroad free from expense, during their attendance on the meetings of the Association.

HENRY S. CHASE,
W. H. EAMES,
A. W. MORRISON,
} Executive Commitee.



Yours Truly
H. G. Pebbles

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

Vol. III.] JUNE, 1871. [No. 6.

ON FERMENTATION.

By Prof. A. W. Williamson, F. R. S.—Before the Society of Arts.—Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 174.)

We left off last week at a point at which we had to recognize a difficulty, which we did not, to any appreciable extent, succeed in solving. By considering in succession a certain small number of processes in which substances induced chemical changes in others which were in contact with them, we classified them, beginning with some very complex cases — cases in which substances of formulæ so long that, even if I ventured to give you chemical formulæ at all, I should hesitate to give you their formulæ — took part in the decomposition, and gave rise to products themselves having formulæ of no small complication. From those we passed to the consideration of some bodies less complex in their structure, and undergoing changes very much like those which we at first considered, but having this remarkable peculiarity that, in these somewhat simpler cases, the changes were effected not only by organic bodies comparable to ferments, but also, in certain instances, by simple mineral bodies, such as the acids. In this intermediate class we found that the same effects are produced, sometimes by diastase, or such-like bodies, and sometimes by sulphuric acid. Then we came to some still more simple cases of decomposition, produced solely by bodies of such sim-

plicity that we chemists have got a tolerably definite idea of them. I gave two cases which, I believe I may say, are pretty well understood. The resemblance between the different terms of that long series served, as I think it will be admitted by those who followed the chain of reasoning, as an argument in favor of there being some great resemblance in the process which takes place in these changes in the successive terms of the series; and I propose, before we proceed further in the study of these wonderful decompositions, to analyze somewhat the nature of these changes in the simple cases which we last considered, in order that we may get, if possible, something like a master-key—a very simply-formed piece of iron—which will open a variety of locks. The two cases which I allude to were, first, the formation of ether and water from alcohol by the action of oil of vitriol; and, secondly, the ordinary process of making oil of vitriol in the so-called lead chambers: and I think it will be admitted, even from the very brief and imperfect statement which I was able to make, that we have evidence of the fact that the active substances do return, after they have been doing one bit of that work, to the point from which they started before doing it. I gave a couple of illustrations of that fact. Sulphuric acid is converted, while making alcohol into ether and water, into a substance called sulphovinic acid, which differs from it in a good many properties, and then it comes back again to sulphuric acid. Just so with nitric oxide, in the process of making oil of vitriol; it first takes up oxygen and assumes the form of those red fumes, then hands that oxygen over to the sulphurous acid which is in contact with it, thus coming back again to the state of nitric oxide from which it had started. Hence the term which I have suggested for this process is cyclical, to denote the fact, which I consider essential, the leading fact that it is a cycle, the idea of which implies that the road by which it returns is not the same by which it goes, and I want that idea to be suggested by the word. In the case of etherification, I wish I could lawfully use formulæ on the blackboard, but it would not do, for I am sure that the greater number of my audience will agree with me that it would be a liberty which I ought not to take; but chemists are in the habit of denot-

ing, by the aid of formulæ, particulars which require to be fully explained. I mention that because, excluding that ordinary process, the particulars of my argument must, of course, be omitted, inasmuch as I do not use the language by which alone those particulars can be conveyed. When the sulphuric acid acts upon alcohol, and transforms it, by a succession of these cyclical processes, into ether and water, the general kind of process is this: A little particle of the acid—because each one acts like the rest, and we had better consider one as a sample of the rest—first takes something from a contiguous particle of alcohol, and then it hands over this something to another particle of alcohol. That which the acid takes in the first instance is called, in our ordinary language, ethyl. It is a group consisting of carbon and hydrogen, very much like hydrogen gas—it is a group of those elements, and behaves in a manner closely analagous to hydrogen itself. The acid, in doing that particular work which we have to consider, first takes a particle of this ethyl from one particle of alcohol, and whilst it does so it gives to the alcohol something in exchange; that something is hydrogen. And by doing this, the sulphuric acid which has taken up this ethyl is converted into sulpho-vinic acid; it has gone half round the circle, in fact. The remainder of its journey consists in reversing, in another way, with another particle of alcohol, that very same kind of interchange which it had undergone in the first instance, that is, it gives up again this little portion of ethyl which it had taken, and resumes hydrogen in place of it. Just as that is the general process when sulphuric acid acts upon alcohol, forming it into ether and water, so in the other process, which I just now reminded you of, there is a similar action, only there is this difference—of course, I speak within those narrow limitations which are imposed upon us by our very imperfect knowledge of even these best-known processes—but, as far as we know, the nitric oxide merely takes up oxygen, but gives up nothing in exchange. Those red fumes which you saw were really nitric oxide *plus* oxygen, not nitric oxide in which oxygen had replaced something else, and that was a difference between the process in that case and in the one to which I just now referred. Then, again, it simply gives up that oxygen to the particle of sulphurous acid.

The illustrious Liebig, to whom we owe, in this order of phenomena as in every other order which he has touched, some of the most valuable ideas which have guided our researches, suggested many years ago, for the explanation of the phenomena of fermentation, a theory which certainly has rendered very great service, and not the less so from the fact that it has been replaced by one more perfect. In building a house, it is certainly no proof that a scaffolding is unnecessary because in the final structure the scaffolding is not maintained; and so in the progress of our science, as in every other science, each part of the work must be judged from its usefulness in aiding the carrying on of the building, even though the particular substance which was placed there at the time does not finally form part of the structure itself. Liebig's explanation really is classic, and well worthy of a few minutes' consideration. He classed together a considerable number of cases of chemical action which bore, at least upon their surface, a considerable resemblance to one another, and he saw in them something in common, and by this one resemblance which they had he classed them, considering it to be their essential characteristic feature. For example, there is a substance which is made, by a process of oxidation, of a compound something like lime. It is called baric peroxide. Thenard had found that the oxygen which is here taken up by the baryta can, by a particular process, be passed over to water, so that, in fact, Thenard, from this oxide of baryta, made, by a process which I will repeat on a small scale, some oxidized water, or peroxide of hydrogen. as it is commonly called. Here is some of the peroxide suspended in water, and by adding an acid hydrogen salt, the hydric nitrate, in small quantities (for if I add it in too large quantities, I should destroy the peroxide, which is a very tender substance, and requires to be treated tenderly), I should gradually transfer the oxygen from the baryta, with which it was at first combined, to the water which is here present. This oxidized water, or peroxide of hydrogen, gives up the organs which it has just taken up very easily indeed; in fact, the difficulty is to prevent it doing so. Amongst processes of that kind, I will show you one simple one. I will pour into the water in this large beaker-glass some

of the solution which I have just prepared, and then add to it a few drops of this red liquid, which is a solution containing chromic acid combined with potash. You see, no doubt, that although I have only added half-a-dozen drops, there is evidence of a chemical change, and the deep blue color which is formed by the contact of the two liquids is due to the formation of a new compound. The chromic acid, which has a red color, takes up oxygen from that peroxide of hydrogen, forming a blue compound. I have purposely chosen this particular instance because the process is a slow one, and we have time to see its intermediate changes. I will leave the glass here, and in a few minutes you will see the blue color will have disappeared, and in place of it we shall have a dirty green color, hardly visible. Whilst that change takes place, if we were to take means to examine carefully what was going on, we should find that oxygen gas passed off, and if we examined the green substance present at the end of the process, and compared it to this original red chromic acid, we should find that it consists of chromic acid *minus* oxygen. The peroxide takes away oxygen from this chromic acid, and yet the chromic acid has got hold of its oxygen pretty firmly; it requires a considerable amount of energy to tear away even that part which is torn away by the process. But at the same time the oxygenated water is losing part of its oxygen. The deoxidation of the peroxide induces the chromic acid to give up some of its oxygen; the one body induces in the other a change similar to that which itself is undergoing. The peroxide of hydrogen is losing oxygen, and it makes the chromic acid also lose oxygen. To state the process in general terms, I may well use the expression of Liebig and call it contagious action. There are many other cases of similar processes. Here is a bit of rotten wood: if I were to moisten it and put it into a convenient flask, leaving room for a quantity of air, closing the mouth of the flask with a good cork, and leaving it for a day or two, also putting with the air a little hydrogen gas, which, you know probably, is capable of combining with oxygen, I should, on examining the mixture of air and hydrogen after it had been in contact some time with this rotten wood, find that the hydrogen had been removed from the air, and

at the same time the oxygen of the air which had been mixed with it had disappeared. Now this wood is actually undergoing a process of combustion; it is actually absorbing oxygen, or being burnt, very slowly, indeed, but still at a rate which is not unimportant, if you want it to last for any length of time. De Saussure, who noticed this, attributed the oxidation of the hydrogen gas to the fact that the wood is itself undergoing oxidation. I will take another case of the same kind. I will put into a little flask some of that peroxide of hydrogen, and will show you another decomposition of it, which is rather more convenient in one respect than the one I first took, as it will show us something more of the process. Into this little flask I put some of the same oxidized baryta which I used just now, and I will fit up the flask in such a manner that the gas, which will come off in a tolerably large quantity, can be collected for examination. I will then put in contact with it a substance called silver oxide, first driving out of the flask all the air which it at present contains. Having driven out the air, I put in a few drops of the nitrate which I employed in the first instance, and then I will put in a solution of silver oxide, which is, in some respects, a good deal like this chromic acid, at all events in one important respect, for it has oxygen, which it can give up under sufficiently strong pressure. You now see there is a great deal of effervescence going on, and the gas which is coming off from the little flask is rising into this jar, where we shall very easily be able to ascertain whether it is oxygen by the ordinary test. I should have been glad, if it had been convenient to do so, to give you one other instance in which a remarkable fact was discovered by Professor Brodie, viz: a case of an action of this kind, where the oxygen taken from the peroxide is in quantity exactly equal to the quantity of oxygen from the other body. Whilst that gas is collecting I must enter shortly upon a theoretical question, apologizing for doing so, not that I am ashamed of it, for it is one of the most important theories we possess, but on account of the brevity with which I am compelled to treat it. Oxygen, in the free state, is admitted by chemists to consist of two little atoms linked together. In each of the compounds which I used there, there was one little atom of the

kind. One atom leaves each of them, and when I get free oxygen, I affirm that there has been a process of combination, that the oxygen from the one substance actually combined chemically with the oxygen from the other. This is a theoretical result which has been, in great part, established by Sir Benjamin Brodie, with the help of materials from various sources. What I mentioned in the other case holds good equally in regard to chromic acid and the other cases in which there was apparently no definite proportion of the kind. There is an actual chemical combination between the oxygen of one substance and that of the other; it is not merely that the one substance is compelled to decompose because the other is decomposing; there is between the one substance and the other an interchange, so that a constituent from each one combines with a constituent from the other. To do justice to the importance of this fact I should need to describe a great number of chemical reactions which at present would be impracticable, but you may take my word for it that the kind of process which I have described is now known to be one of the commonest in chemistry. The other day, when I mixed two of the commonest substances, there were interchanges between the constituents by a process perfectly analagous to that which takes place here. Here it happens, by an exceptional circumstance, that the element which from the one body combines with the element of the other is of a like kind, whereas, as a rule, you find that unlike elements unite together in these processes. Thus it is that the anomaly which Liebig noticed ceases to be an anomaly, and is brought back to a case of common regular chemical action by the aid of that theory to which I have just alluded.

To return to our experiment. This glass vessel is now full of the gas, and by applying a taper which has been lighted and blown out, but is still glowing, we shall find, on putting it into the jar, that it immediately ignites, which is the ordinary test of oxygen gas. By the aid of that theory, which has been discovered since the time of Liebig's suggestion, this one case of apparently anomalous action has been proved to be a perfectly normal and regular case of combination, and the same kind of thing has been done with regard to other cases of the same des-

cription. A number of other processes which he classes with these may be shown to be due, not to any exceptional force that is at work in these cases, nor to the force of any particular contagious action among chemical substances, but to the ordinary forces which induce chemical combination in the cases best known to us. Liebig's theory of contagious action has been alluded to, by a high authority in this country upon philosophical matters, as being a law of chemical action of a generality comparable to the law of gravitation in astronomy, and for that reason, if for no other, it must be of considerable importance to know what bearing our most advanced knowledge has upon that law. I dare say you see the connection between it and the case of fermentation. I will not go into particulars, further than is necessary in order to show you the general analogy.

(To be continued.)

From the "Chicago Medical Examiner."

ATMOSPHERIC GERMS AND THEIR RELATION TO DISEASE.

By Frank H. Davis, M. D.

Notwithstanding the time and attention which the ablest scientific observers have devoted to investigation of the subject, we have still very little definite satisfactory knowledge of the most common and best understood diseases. It is not probable that the possession of this knowledge would be of any practical assistance in the treatment of disease, but as a key to the proper hygienic measures to be adopted, an understanding of the true source and nature of these causes, or influences, would be of the very greatest importance. By the neutralization or destruction of the poisonous material, or at least the avoidance of exposure to their influence, we would, in many instances, be enabled to avoid the contraction of disease, and could effectually prevent the extension of the contagious or epidemic diseases. The dis-

covery of the efficiency of vaccination, and the method of isolation now practised with all contagious diseases, has reduced unmeasurably the ravages of that class of affections. The epidemic diseases, however, of which cholera is a prominent example, are much less easily controlled. Isolation is of no avail; exposure to foul air and unhealthy surroundings, where the poisonous effluvia, from more or less decomposing material, is being constantly inhaled, being probably the method in which these diseases are contracted, and not to any exposure to the persons diseased. When the discharges from cholera patients are allowed to remain and decompose in the room, or are thrown in an open place, where they contaminate the atmosphere, they will, of course, exert the same poisonous influence as any other putrescent material.

In searching for the origin of the various diseases, wherever no other reasonable tangible cause could be assigned, atmospheric impurities or poisons have usually been held responsible. It is a well understood fact that persons affected with certain contagious diseases, as variola, rubeola and scarlatina, contaminate the atmosphere for a certain distance around them with a specific poison capable of propagating the particular disease by which it is engendered. These poisons, however, are of so subtle a nature as to have eluded every attempt at actual demonstration, and we can only prove their existence by their effects. An examination, even, of the poisonous material of the variola pustle, which is known to be capable of engendering the disease, affords us no satisfactory explanation of its peculiar properties. Prof. Lionel S. Beale, in a recent article in the *London Microscopical Journal*, says: "I have examined the contents of the little vesicle which rises in small-pox at different stages of its development, and find, as in allied pathological changes, vast multitudes of minute particles of living matter or bioplasm, but, as will have been anticipated from what has been already said, these present nothing peculiar or characteristic, nothing that would enable us to say, if we saw these particles under the microscope, that they were obtained from a small-pox vesicle, and would certainly give rise to that disease."

The germ theory attempts to account for the origin of these diseases by supposing the existence of certain specific germs, of either a vegetable or animal nature, which, floating in the atmosphere, are introduced into the system with the inspired air. As the most rational and probable explanation that has been offered to account for the occurrence of these phenomena, this theory has been very generally accepted by the scientific world. Miscroscopists have failed, however, as yet, to demonstrate the existence of any such specific germs holding a definite relation to the origin of disease. Organic germs are found to be present, in more or less abundance, in all atmospheres. The large amount of solid material present in air apparently perfectly clear and pure, is most beautifully shown by the very common and familiar phenomena which occurs when rays of sunlight enter a darkened or partially-darkened room, through a narrow opening in a blind or curtain. A cloud of very minute dust particles, floating about and glistening in the sunlight, mark the passage of the rays through the atmosphere, the particles being perfectly invisible anywhere outside of their course. Prof. Tyndell has proved these invisible dust-clouds to be made up of organic material, by the very simple experiment of introducing the flame of a spirit-lamp into the rays, when most of the particles were consumed and a dark smoke produced. This, however, by no means proves the particles to be *living* germs, and being apparently normally, or at any rate constantly present in the atmosphere, *they* cannot, of course, be considered as holding any causative relation to disease.

The occurrence of suppurations, of erysipelatous inflammations, gangrene, etc., in wounds after surgical operations, and in abscesses which have been opened and their cavities exposed to the air, is also attributed by many surgeons to the absorbtion of living germs from the air. In accordance with this theory an antiseptic mode of treatment has been devised by Prof. Lister, and since modified and improved upon by Prof. E. Andrews, of this city. The treatment consists, essentially, in the exclusion of the suppurating surfaces from contact with the air, wherever possible, and in the thorough application of carbolized solutions

and dressings to such wounds and abscesses as have been exposed to the atmosphere, carbolic acid being supposed to possess the power of destroying all organic germs.

This antiseptic treatment has been thoroughly tested by Prof. Andrews in the wards of Mercy Hospital, and its efficacy fully established by the results obtained. Do these favorable results, however, necessarily confirm the correctness of the germ theory? or, are not the injurious effects resulting from the admission of air to wounds and abscesses quite as readily accounted for by other equally probable theories? May not, for instance, the organic matter thrown off from the lungs and the cutaneous surface, when retained in close and badly-ventilated rooms, or in crowded hospital wards, until it has undergone decomposition, be of itself capable of poisoning, not only the exposed wounds, but also the blood and system generally of the patients compelled to breathe the atmosphere thus contaminated? In support of this theory we have the testimony of some experienced surgeons, Dr. Skey, of St. Bartholomew's, for example, who still claims that the presence of air in wounds is entirely inocuous where the patient's room is properly ventilated.

The results of numerous careful microscopical examinations of the ordinary atmosphere, and also of various special atmospheres, have been published in the *London Microscopical Journal* during the past year. These examinations, although productive only of negative results, as regards the disease-germ theory, have, nevertheless, led to the discovery of some curious and interesting facts in regard to atmospheric impurities.

In the atmosphere of a dissecting hall, according to the observations of George Seigerson, M.D., "Fragments of fibres were found present, with the marks of the scalpel on them. There were fibrils of voluntary and of involuntary muscles of white and yellow fibrous tissues; some epithelial scales, fat cells, corpuscles, fine fragments of hair, and inchoate particles. It was a somewhat ghostly revelation; but might be of advantage by inducing those in authority to ventilate thoroughly and disinfect daily." The same observer also says, "Tobacco smoke, with some difficulty, was got under the microscope. It was ex-

amined on entering and on leaving the mouth. Little globules of nicotine were discovered twirling and flitting about in it, like monads. Some remained on the walls of the mouth; when the smoke is breathed (by novices) more globules are retained in the lungs, and nausea and illness supervene. These globules, if found in the air, distributed by cigar-smokers, might be taken for germs, as they would resist the iodine test for amyloids."

In the atmosphere of an iron-foundry, iron was found to be present in the form of balls. "These were found to be hollow, and the fragments of their shells were discovered to be translucent. These iron bombs, or balloons, varied from $\frac{1}{500}$th of an inch to $\frac{1}{5000}$th, having been measured with the micrometer. The diameter of a bomb of $\frac{1}{2000}$th of an inch was computed to be sixteen times greater than the thickness of the shell, which would therefore be about the $\frac{1}{32000}$th of an inch. The computation was made in order to find at what degree of thickness its iron material was translucent. There were no spores or seeds present, no fibres at all except a few cotton filaments from the garments of artisans, fibrous carbon particles, and a specimen of contorted, branchy metal. There were no germs here, yet the sunbeams were full of dancing motes. The ray shining on them assumed, in consequence of their hue, a bluish color, similar to that observed when the carboniferous smoke of a candle or lamp is placed in the track of a sunbeam. On entering such an atmosphere, the taste of carbon, and, indeed, of iron, may be readily perceived."

During the past few months, I have, myself, made a number of microscopic examinations of the atmosphere of rooms in which patients laboring under different diseases, contagious and otherwise, were lying, and have also examined carefully the breath of the patients themselves. These examinations were conducted in the following manner: A drop of clear, pure glycerine was placed upon a perfectly clean glass slide, which had been carefully excluded from contact with the air outside of the sick-room. The slide thus prepared was placed upon a shelf, a window-sill, or any convenient place, where it could remain undisturbed for twenty-four hours. The currents of air passing

through the room brought more or less of the dust and floating particles in contact with the glycerine, by which they were retained. A slide similarly prepared was then held, for a minute or two, before the mouth and nostrils of the patient, so that the solid particles contained in the expired air might be caught upon it.

The observations were made in the presence of several cases of typhoid and typho-malarial fevers, one case of erysipelas, one case of scarlatina, one of rubeola, and one case of diphtheria. The atmosphere of my own sleeping apartment, and of that of other rooms occupied by perfectly healthy persons, was submitted to a similar examination, as was also the breath of healthy persons.

The principal difficulty experienced in examining these slides was caused by the large amount and variety of the materials which the glycerine had entrapped. Particles of feathers from the beds or pillows, white cotton fibres from the sheets, red and blue woolen fibres, etc., were readily distinguished in most of the specimens. Numerous and various other particles, the nature of which we were unable to determine, but some of them easily capable of being construed into germs, were also present in every instance.

On a careful comparison of the slides exposed only to normal, healthy atmosphere, with those which had been exposed in the contaminated or contagious atmospheres, we were unable to detect the slightest particle of any kind in the one which was not equally present in the other. The materials brought to view, therefore, whatever organic matter or germs may have been present amongst them, could not be considered as holding any relation to disease.

We regret that the pressure of other duties this winter has rendered it impossible for us to devote the time and study to this subject which we desired. The few hasty observations which have been made by us are too incomplete to be of any interest or importance by themselves. Their negative results, however, are confirmatory of the conclusions arrived at by those who have given the subject most attention. We are forced

therefore to conclude, either that the disease-producing poisons, for which we have been searching, have eluded all the various contrivances devised for the purpose of bringing them under observation, or else that these influences emanate from some of the normal excretory products, in which we may suppose certain changes to have taken place; changes which are, however, neither apparent to the eye, nor appreciable by any means yet discovered.

From the "Boston Medical and Surgical Journal."

THE ORIGIN OF INFECTIOUS DISEASES.

Extract from an Address "Ueber Lazarette und Baracken. Von Rud Virchow." Translated from the Berliner Klinische Wochenschrift for March 6, 1871, by R. H. Fitz, M. D.

Virchow, in an address delivered before the Berlin Medical Society, Feb. 8, 1871, thus explains briefly his idea concerning infections.

In speaking of the value of statistics in determining the utility of this or that plan for hospitals, he says, "I have always had a great regard for statistics, but I have never recognized that rough statistics yield practical results, and least of all can I admit that the mere quantity of deaths, without regard to the quality of the cases treated, can yield a safe basis for the answer to the question, whether a hospital may be a good or a bad one. Statistics do not form a science, merely a method, and, as is the case with all methods, the question becomes—has a proper use been made of them?

The subject assumes another view where one analyzes the quality of the deaths, and seeks the causes upon which they depend. Here, however, we meet immediately with another difficulty, namely, the scientific differences with respect to the view of certain diseased processes, which have rarely been presented in so forcible a manner as of late. In this relation I will

call attention to one scientific question only, which has probably occupied the minds of most of you, viz: in what manner does an erysipelas originate?

There are very prominent scientific men who decidedly incline to the idea that every erysipelas, from the first, depends upon an infection, wherever possible upon a contagion. According to my mind, it would be of advantage for the consideration of these questions, not simply to identify infection and contagion. Should it be proven that erysipelas is contagious, it by no means results that it proceeds at all times from an infection. Even where one finds that every erysipelas is infectious, one has not yet proven that the same was primarily produced by an infection, since an originally simple and local process may have the power to produce various impurities in the body, and in this way become infectious.

It is the case with many other processes as with erysipelas, and I would therefore especially warn against complicating the idea of infectious diseases, by supposing at the outset that every infectious disease, *according to its origin and its causes*, is necessarily produced through impurities (infection).

In close connection with the subject of infection is the question concerning the origin of disease from certain small organisms. As a consequent continuation of the direction which investigation has taken of late years, the view has become more precisely formalized, and with a certain justification, that the cause of all infectious diseases is to be sought for in the form of little organisms which are to be found in the body. Were this correct, and if, despite many doubts, the idea prevailed at the present that every living being is to be deduced immediately from a preceding living existence, that every independent organism descends from a maternal organism, in short, the *generatio æquivoca* excluded, it by no means necessarily follows that every infectious disease is to be derived from the outside.

I am of the view that one goes much too far, even here, and that one, even in those cases where distinct foreign organisms can be proven, very frequently, in judging of the injurious results, confounds the organic *existences* with the organic *materials*

which are produced by them, which at the same time may arise in like manner independently of them. It is plain that if chemical bodies are generally produced by such organisms, it is by no means proven that these bodies are produced only in this way. They may originate also through other processes which agree in final results with those products generated through certain organisms.

Even in those cases where organic existences are the real actors, we must discriminate between the activity which the living organism, *as such*, exercises, and that which *its products* give rise to. In this respect we have a very instructive example in the fermentative processes. No one doubts that these are brought about through certain fungi. When, therefore, such fungi are found upon any part of the body whatever, one becomes strongly inclined to conclude that on this part something of a fermentative character has taken place. Are injurious processes at work, one says that these are produced through the presence of the ferment-fungus.

But no one can believe that the existence of the fungus itself, or its immediate action upon the part, produces the injurious influences; we know rather that the fungi gives rise to fermentation, that thereby they bring into existence new chemical products, and that which finally becomes injurious is not the fungus as fungus, but the injurious materials which it produces. These injurious materials do not occur necessarily in the interior of the fungus. The ferment-fungus is not poisonous in the ordinary sense of the word, as other poisonous fungi are. One can eat a large amount of it without harm. It is well known that one has given medicinally large amounts of yeast in diabetes; it was well borne, and we know that no cases of poisoning have resulted from such treatment; the injurious effects are to be ascribed to the products of the fungi, but not to their constituents, nor to the immediate action which they exert upon the tissues of the body.

If one employs a similar method of consideration in the case of the infectious diseases, one will not deny that the mere proof of the existence of this or that organism, even the proof of the

constant presence of the same at certain points, in no way suffices to prove that this organism is the immediate cause of the attacks of illness. We have an apt example in the investigations which have been made of late years concerning the diphtheritic processes. One thought to find the injurious agent in a micrococcus, and saw the real means of the infection of the body in the passage of the same into the blood. How great was the surprise when these organisms were found in the blood also under conditions where they present no symptoms. I may call attention to that other curious example which the cholera has presented.

One found here in the intestinal contents large masses of fungi, which were immediately regarded as a proof of the organic nature of the cause of cholera.

Some time ago I called attention to the fact (*Virchow's Archiv*, 1869, vol. 47, p. 524), that apparently the same fungus occurs in enormous amounts in acute arsenical poisoning, which presents symptomatically so strong a resemblance to cholera, and where it was probable, *a priori*, that in the examination of the intestine diagnostic points of difference would be discovered. This observation has been confirmed by Hoffman (*Virchow's Archiv*, 1870, vol. 50, p. 455).

So little as I contend against the correctness of the tendency of the thought, which forms the basis of later investigations, that the peculiar history of the infectious process leads strongly to the suspicion that certain organic beings form the source of the contamination, still I must say that present experience is still far from furnishing a secure foundation for a general doctrine of infection, and that great prudence is necessary when it becomes a question concerning the employment of such a doctrine in definite diseased conditions. For my part, the theory of contaminating materials is not yet wholly identical with the theory of the contaminating existences.

As to cases of infection after wounds, in particular, another source of error is near at hand, according to my idea.

The fact that one is considering wounds, *open* passage-ways, easily leads one to push into the foreground, somewhat one-sided, those cases where a contact of the deeper parts with the outer

air has undoubtedly occurred, and the importation of impure air might take place without difficulty. On another occasion, as I discussed the puerperal diseases in the Obstetrical Society (*Verhandl. der Berliner Gesellschaft für Geburstshülfe*, 1865, XVII. S. 21), I called attention to the point that several cases have been demonstrated where infectious processes which are generally seen in connection with open wounds, e. g., deep-seated gangrenous phlegmona (pseudo-erysipelas), also occur in connection with an *unbroken* surface. So at present, with regard to wounds, I would lay stress upon the fact that when one, free from prejudice, brings together a great number of experiences, and does not confine himself exclusively to wouuds, many doubts arise whether really all impurities of wounds are to be attributed to the importation from outside. Let one compare attentively the severe phlegmonous inflammations which arise in connection with an intact surface, and in which the worst results may occur, without the entrance of impure substances through solutions of continuity of the surface. I have observed a series of such cases where the most careful examinations of the skin did not show excoriations even from which we might follow out the contamination.

According to my idea, such a comparison is indispensable in the consideration of the theory of local contamination, for, so long as one observes only the one category, where open wounds are present, so does one deprive himself entirely of the opportunity for correction. One is in due form driven to the view that the contamination has occurred from outside, and, if other sources are wanting, one helps himself only too rapidly with the idea that it must have been the air which, by contact with the surface, has produced the contamination.

Such an explanation is very convenient for diminishing the personal responsibility of the physician in attendance, where a change of locality is impossible. And yet no one, who has had a large hospital experience, can doubt that the care and skill of the physician produces the best results under the same conditions of air and space, under which, in the care of another, gangrene and erysipelas break out.

I have thought myself compelled to present these remarks at the outset, not for the sake of contending against, even of weakening, the views concerning the importance of pure air in the treatment of wounds, but because I wished to show with how many precautionary measures every investigation must be surrounded, which is to draw conclusions from a limited number of cases, and how very necessary it is to employ the greatest foresight in the answering of the question: Of how much importance are the statistics of death and disease in the judgment concerning the good qualities of the air and space in which such occur?

Operative and Surgical Dentistry.

From the "Dental Cosmos."

RESTORING THE CONTOUR OF FRACTURED INCISORS.

By Chas. J. Essig, D. D. S., Philadelphia.

The following operation was performed upon a right central incisor tooth, and proves in every respect so satisfactory that I think a brief description may be of some interest to the profession.

The patient, a student of the Philadelphia Dental College, had the misfortune ten years ago to break off, by a fall, about two-thirds of his right central incisor.

He applied to me some weeks since, and desired to know what could be done to restore the tooth to something like a normal appearance.

The idea of restoring its shape by what is known as "contour filling" was abandoned as soon as thought of, as was also that of the usual method of pivoting, for the following reasons: First, we would be obliged to cut away, and consequently lose, the sub-

stantial body of the tooth, with its enamel covering, and depend upon the frailer portion, the root. Secondly, the difficulty of matching in general appearance the adjoining teeth, they being somewhat peculiar. And lastly, the knowledge that the period of usefulness of pivoted teeth is, under the most favorable circumstances, a short one. So, as neither of these methods afforded the two important desiderata of permanency and natural appearance, I decided to splice the broken tooth with a piece of porcelain. This was done, and the contour perfectly restored.

The method of proceeding was as follows: The vitality of the tooth had been destroyed by the accident, and some years after the pulp canal had been filled with gold. The fractured portion presented an uneven edge and surface, which extended diagonally inward and upward toward the adjoining central. The first step was to remove the irregularities and obtain a perfect edge and a level surface, by means of a flat file. I then drilled up, following the pulp canal, to the depth of one-quarter of an inch, with a No. 16 drill of Palmer's set, following and slightly enlarging with a flat burr-drill. A small square gold box was next constructed,* placed in the canal, and the four sides carefully and firmly filled around with gold. Into this box a pin made of platina gold fits accurately, the pin being split fully two-thirds of its length. At this point an impression was obtained of the broken tooth and the adjoining central and lateral ones. The pin which had been left long enough to project three-sixteenths of an inch from the box, indicated in the impression the inclination of the canal.

A cross-pin plain plate-tooth was next selected to exactly match in color the natural one; it was ground away equally from the cutting edge and neck, so as to leave the pins as nearly as possible in the centre of the porcelain; it was then fitted accurately to the tooth, and the cutting edge ground to imitate that of the adjoining central.

The piece was at this point found to nearly cover the mouth of the box, being almost as thick as the tooth itself. This difficulty was readily obviated by cutting off all that projected of the gold

*This box and square pin have been used by several members of the profession in this city for setting pivoted teeth for more than five years.

pivot and upon its end soldering a small plate, which fitted accurately upon the plane mentioned above as having been leveled with the file. A gold backing was then fastened upon the piece, and a slight concavity ground in the porcelain to receive the little plate. Before, however, finally soldering the piece to this plate, it was temporarily fastened with cement and tried in the mouth, as the plaster cast is liable to undergo some change in handling. It was then removed, after some little extra adjustment, invested in sand and plaster, and the backing and plate united by solder.

The piece can be removed and replaced with every facility, and the flat surface cleansed and polished whenever deemed necessary.

When in position, the line of union is almost imperceptible, and is really not observed unless attention is specially directed to it, and a very close examination made.

It has now been worn and thoroughly tested for several weeks, and its appearance is unchanged.

POISONING FROM CHLORAL HYDRATE.

Reports of fatal results from the use of chloral are becoming unpleasantly numerous. Not long ago we commented on a case, recorded by Dr. Needham in the *Journal of Psychological Medicine*, where death followed the administration of this agent under skilled advice and in moderate doses, and there lie before us now the accounts of several other mortal accidents. In the *British Medical Journal* of the 25th ultimo is given the first instance of poisoning by this drug reported in England, in the case of a clergyman who had acquired the habit of taking chloral at night, commencing with scruple doses. During two months, the dose was gradually increased, until it is estimated that he took fourteen or fifteen drachms in the ten days preceding the 27th of January, on the morning of which latter day he was found dead in his bed. The only abnormal post mortem appearances were

increased vascularity of the stomach at its cardiac extremity and along the lesser curvature, with minute submucous extravasated patches of blood in the former situation (the patient had been a sufferer from dyspepsia); a marked congestion of the cerebral membranes, which contained about an ounce of red serum, and presented old adhesions to a small extent on each side of the superior longitudinal sinus; and pallor with softness and friability of the cerebral substance. "There was no increased vascularity in any part except the choroid plexus; no effusion in the ventricles, nor extravasation of blood." These appearances are very different from those observed in the autopsy of Dr. Needham's case, where increased vascularity pervaded the entire brain, the only point of resemblance between the two cases being that in both there was found great congestion of the membranes.

In the *Buffalo Medical and Surgical Journal*, Dr. Holbrook, of Palmer, Mass., reports the death of the wife of a clergyman in that town. This lady took the entire contents of an ounce vial of chloral, from which her husband had taken but three doses, the quantity ingested by her being estimated at over one hundred grains. About twelve hours afterwards, Dr. Holbrook found her in a comatose condition, with contracted and insensible pupils, injected conjunctivæ, livid face, and cold extremities; the heart's action very feeble. Death ensued in about fifteen hours from the time of taking the drug, the patient never recovering consciousness. No autopsy was made. [A recovery from a still larger dose of chloral is reported in the *Medical Times* of Oct. 15, 1870, in the case of a nurse in the Philadelphia Hospital, who took 460 grains in a single draught. Restoration was effected by means of sinapisms to the extremities, vigorous flagellation, and the application of a powerful Faradic current along the spinal column, the phrenic nerves, and to the chest.]

The Hartford *Times* recently reported the case of Frederick Ripley, a station-agent at Avon, Conn., for whom chloral was prescribed as a hypnotic by a physician. For about ten days it was taken with pleasant effect; at the end of that time a fresh supply was obtained from a druggist in New Haven, the first dose of which was followed by death in half an hour. Coming from

an unprofessional source, the account of the symptoms is of course unsatisfactory, but there seems to be reason to suspect that in this instance some irritant poison was mixed with the chloral.

The San Francisco *Chronicle* of the 7th instant contains a highly sensational article on the death of a Mr. Hixon, of that city, who, on the recommendation of a friend, took one evening about an ounce of an advertised "elixir of chloral hydrate," and was found dead in bed next morning. In the report of the coroner's examination, no mention is made of the condition of the brain and meninges; but the thoracic and abdominal organs are said to have been healthy, with the exception of slight traces of disease in the kidneys, and a somewhat congested state of the lungs.

When first unfavorable results from the administration of chloral were brought to notice, we were inclined to suspect the purity of the drug; but from a number of analyses published in the *British Medical Journal* it would appear that there is little variation in the samples of different manufacturers, at least as far as the English market is concerned. In six specimens examined, the percentage of chloroform by weight was from 68.11 to 69.61; the percentage of chloral hydrate in the corresponding samples being from 94.33 to 96.41. Nor does it seem, as has been feared, that an alcoholate instead of a hydrate of chloral is often found in commerce. It is, therefore, to physiological rather than to analytical chemistry that we must look for an explanation of many cases of chloral poisoning. Our knowledge of its physiological action is as yet very far from exact, the only established contradiction to its use being in cases of organic cerebral or cardiac disease, with a little heeded caution against its hypodermic injection. Three pharmaceutical points, however, it may be well to bear in mind: Firstly, that chloral hydrate when procurable in hard, transparent crystals is less likely to contain impurities than when in the form of an opaque, amorphous cake; secondly, that a simple test of its purity is its property of disengaging chloroform when mixed with an alkaline solution, without alteration of color; thirdly, that if kept in mixture for

any length of time it is apt to undergo decomposition, which renders it either inert or dangerous, and that, consequently, all prepartions ready-made for domestic use are to be unhesitatingly condemned.—*Medical Gazette.*

A NEW METHOD OF USING GOLD FOIL.

By Professor Arthur.

[The following article is copied from the *Dental News Letter*, of April, 1855. It will be interesting to young practitioners, as showing them something of the early history of *adhesive foil.*— Chase.]

Some few months since a short article on "Sponge Gold," written by me, was published in the "News Letter." It was simply intended for the purpose of doing my part in calling the attention of the profession to it as a desirable improvement, and to express my confidence in it as a reliable material for filling teeth. I did not pretend to go at any length into the subject, but made some simple general statements, promising to prepare a detailed account at some future time, of methods of using it which had enabled me to employ it with success. I had very soon found, after beginning to use the "sponge gold," that it could not be relied upon if the directions by which it had been accompanied, when sold, were followed; and I was not at all surprised that disappointment in the expected result occurred as a consequence of its use in this way. Heavy demands upon my time, however, have prevented me from preparing such an article as I intended, and it will now be rendered unnecessary, I presume, by a publication in preparation by Messrs. Watts & Co., of which I have seen a part of the proof-sheets. I have, indeed, within a short time past, fallen upon a new field of experiment, and find that by using gold foil in a way somewhat differing from

that in which it is ordinarily used, it can be worked precisely like "sponge" or "crystallized" gold.

I have never regarded gold foil, as ordinarily used, as a perfect article for the purpose intended. There are very few members of our profession, I presume, who are not aware of its defects. That it has answered the purpose of filling teeth better than any substance brought before the profession, until lately, I am well aware, but still it has always been my desire, as I know it has been that of many others in the profession, to find something free from its defects.

It is well known that no adhesion takes place between the layers of gold foil, as ordinarily used, and the retention of the whole mass of a filling depends upon the form of the cavity, or upon the lateral force it is made to exert upon the walls. The manner in which most good operators proceed to fill a cavity with foil, no matter how they may prepare it, is to begin at one side and condense the filling toward that side, making sure to allow some of the gold to extend above the mouth of the cavity, far enough to make it level with it after it is condensed at the surface and properly burnished.

Now, it is impossible, if the filling is well condensed, to add more gold directly to the surface. The layers of foil, as ordinarily used, will not adhere to that portion which is previously condensed. It becomes necessary, in such case, to remove the whole filling, or to cut away so much of it, if it be large enough, as to furnish a reliable hold for the additional gold. This is a defect in foil for which I have always been anxious to find a remedy.

I found by experiment some few years ago, that by using heavy numbers of gold, a result might be obtained approximating, at least, what was desired in this way. I proposed to employ No. 30 gold foil, with sharp pointed instruments, as I found that by forcing the single strip of heavy gold into contact with portions previously introduced into the cavity, a kind of union between the different portions might be effected. In this way I found myself enabled to add strip after strip of gold to a filling, until I had accomplished the object in view. I made use of this form

of gold foil, in this way for nearly two years, exclusively, and only abandoned it in consequence of the difficulty of keeping myself supplied with suitable instruments, which it is impossible to have properly made by an instrument maker. The points required are necessarily very hard, and easily broken. Still I accomplished with this form of gold all I expected from it, and abandoned its use for the reason stated alone. It is not improbable that gold in this form may still be found desirable, if used as I am about to propose.

I again went back to gold foil as I had formerly used it, and employed it in this way until my attention was called to the article introduced to the profession under the name of "sponge gold." The first I used was made by White, of Utica, and it at once struck me as being a most desirable improvement, in many respects, upon gold foil. A specimen of Watts & Co.'s gold was then put into my hands by the inventor, and I found it free from the objection of friability, one of the most defective features of White's preparation. It was a beautiful specimen of this material, and I have never since found any which in all respects satisfied me so well. I took hold of the new form of gold eagerly, and soon found that by using it (very differently, however, from the manner described) I could obtain better results in my operations than I had ever been able to reach before. I used the "sponge gold" with greater satisfaction, for more than a year, than any other material I had ever taken hold of. I have seen my operations repeatedly, and at long periods of time, after they have been performed, and I have never in a single instance observed any change in its appearance or consistency, except when from unfavorable circumstances the operation was imperfectly performed. I feel no hesitation therefore in saying that the confidence I have expressed in it, in the article alluded to, I still retain.

But "sponge gold" has unquestionably, with all advantages, its own defects, which have interfered with and must prevent its general adoption. Its friability leads, in many cases, to more less or waste. As far as my own experience goes, it is exceedingly difficult to work, if it gets at all wet during the performance of an

operation, and it certainly consumes more time to perform reliable operations with it, in the great majority of cases, than gold foil. Still its advantages, with all these defects, as I have said, were so great in bringing about desirable results, that I have been willing to devote the additional time for the sake of making more perfect operations when completed. If these difficulties can be overcome, and an article found free from the defects of "sponge gold," which can be worked in the same way as this material, that is, if adhesion can be obtained between the portions placed in a cavity, a further advance unquestionably is made.

In making some experiments for the purpose of testing the relative solidity, when condensed in a cavity, of gold foil and "sponge gold," I found the foil may be made to work in precisely the same way as the sponge gold, and as perfect adhesion obtained between the different portions of gold put in a cavity as with this material. Nothing more is necessary than to cut the sheets of the ordinary numbers of foil into two or three pieces, roll up very loosely, and hold it in the flame of a spirit lamp until it reaches a red heat. It will at once be found to have become so adhesive that, with small and sharply serrated instruments, it may be made to adhere as readily as the best specimens of "sponge gold." It is necessary, however, when gold foil is used in this way, that it should be cut into small portions, for the very adhesiveness which it acquires when treated as I have proposed, prevents it from working well if an attempt is made to use it in the ordinary manner.

The instruments which I have found best adapted to the use of gold in this way, are small flattened pluggers, with two sharp points cut at the end, and made so hard that they will not turn. The gold may be picked up with such instruments, carried to the desired place, and condensed precisely as "sponge gold." It is well to go over each piece added, with a single sharp point.

Although I have been making use of gold foil in this way for only about a month, I am exceedingly gratified at the results I have obtained, and am urged to call attention to it.

It seems very strange that so desirable an improvement as this should have been in our hands so long a time, and yet not dis-

covered. I presume many operators have attempted to restore gold foil, which had become impaired, by reheating it. I did so myself years ago, but found that the very adhesiveness it acquired by this process, interfered seriously with its use in the ordinary way.

I have felt it necessary to make this long statement in order to protect myself against the charge of vacillation, as I have at various times earnestly advocated several different methods of filling teeth. My strong desire has always been to improve, for my own benefit and that of others, the methods of performing the operations of our profession. I always have been, and always shall be, ready to take hold of any new thing which promises advantages, and to test it as thoroughly as I am capable of doing. I have not changed my ground in relation to any of the forms of gold I have advised to be used. Each has certainly the advantages which I attributed to them. I do not now take the ground that I have been mistaken in my expressed views of "sponge gold;" I still regard it as perfectly reliable, when properly used. But for ordinary use, I am convinced that gold in the form I am now recommending it, is a decided improvement upon any method of using gold, hitherto known. Whether it will be regarded as superior to "sponge gold," in the hands of those who have successfully used this material, is a question which time and trial can alone decide.

I have no idea that gold will be used generally in the manner I now recommend. It is exceedingly difficult to induce men to change a course which they have successfully pursued for years, and the difficulties of which they have learned to encounter and overcome, for any new thing. And, even if they are disposed to make a trial of a new process, it is often so imperfect a trial, that it is unsatisfactory. With regard to the matter in hand, simple as it is, I confidently say to every operator in the profession, that if fairly tried it will afford advantages in the use of gold gold foil of which few have dreamed.

I may say that the foil of different manufacturers present a remarkable difference in regard to this quality of adhesiveness. It is certainly advisable to try several kinds, if that in hand does

not work well. The profession may rely upon the full truth of the statements I have made. I have never, in the course of a practice of fifteen years, made use of any material for filling teeth which has so fully satisfied me as foil used in the manner I have described.

Mechanical and Miscellaneous Department.

CHLOROFORM AS AN ANÆSTHETIC IN FILLING TEETH.

I have occasionally used chloroform by inhalation for eleven years, to deaden sensation in excavating teeth preparatory to filling. My first patient was (in 1860) Mrs. I., of Nebraska, a relative whom I was visiting. I cleaned one cavity and filled it, the tears coursing down her cheeks, every muscle writhing, and nerves twitching with pain. When I had finished, she looked me full in the face and said: "Cousin, if you cannot give me something to alleviate the pain, although I prize my teeth as jewels I will lose them." The day following I commenced again. thinking that by kindness, sympathy and persuasion I could succeed. After cutting once or twice, she caught my arm, and positively said, "stop, I will give up my teeth." She was *enciente.*

I then gave her chloroform, not to destroy consciousness, but sensation—letting her hold a saturated napkin, and as it would pass off, take a few inhalations to keep her under the influence. When I got through, she said, it was one of the greatest boons of this age, and that children unborn would bless the inventor. I filled twelve cavities with the same happy effect—filling about one a day. Since then I have been using it more or less, until within the last two years, when I commenced to give it to at least one half of my patients.

I administer it slowly at the start, with my finger on the pulse; always stopping if it commences sinking. I clean two or three cavities at a sitting. I think it the duty of the profession to operate with as little pain as possible. Hundreds of teeth are lost from the dread of the indescribable pain that cannot be conceived until endured. Professor Trousseau said he often kept infants of a few months old under the influence for five or six hours at a time, (always regulating the amount by the pulse) saving the child's life. In many cases this is not a necessity. But there are others which imperatively demand that, if within our power, we should obviate the pain.

Sol. Horine.

Court Home, Mo.

JOURNALISTIC.

The subject of fermentation has for the last few years attracted very general attention among scientific men, and especially has this been the case among physiological and pathological observers. We therefore make no apology for laying before the readers of the Journal the following, which we take from the *Druggist's Circular*. We hope this extract, together with the series of lectures which we have published upon this subject, will suffice to give a pretty accurate idea of the present doctrines which are entertained by scientific men upon this most interesting and important topic:

"THE THEORY OF FERMENTATION."

"This question has been discussed with great eagerness by physicists of late years, on account of its many physiological relations. The following article from the *Scientific American* has, therefore, a general interest:

"Liebig has finally broken through the silence with which he has borne the attacks upon his theory of fermentation, on the part of many chemists during the last ten years, and has come

out with one of those exhaustive and convincing replies that recall the best days of his great intellect.

"The reticence he has observed has emboldened some of the younger chemists to disclose weak points in their attacks; while others have looked upon the dead lion as a harmless creature, and have incautiously come too near his claws. All this small game is scattered like chaff before the wind with trifling effort, and the whole power and force of his argument is leveled at the French academician, and renowned champion of the new school, Professor Pasteur, of Paris.

"For ten years Pasteur has had it his own way, and the views published by him have been fast gaining popularity, until they appeared destined to be accepted by a majority of scientific men everywhere. Liebig's paper is therefore a perfect bombshell in the camp, and as soon as the smoke has cleared up, and the fragments have been collected, we shall probably have about as nice a fight as has been witnessed among chemists for many a day. In the meantime, we propose to give an analysis of what Liebig says in defence of his old theory of fermentation. It is difficult to make an abstract of so learned a paper, but we shall endeavor to render the subject intelligible to our readers.

"Pasteur announced, nine years ago, as the result of his experiments, that Liebig's explanation of the action of yeast on sugar was entirely without scientific foundation.

"According to Liebig, 'a fermentable body is one which, by itself, or simply dissolved in water, does not undergo any decomposition, but when in contact with a putrescent body is resolved into new products or enters into fermentation. As fermentation is produced by the communication of motion from the atoms—not the molecules—of the putrescent body, to the atoms of the fermentable one, the process requires time; and the same is true of putrefaction itself. And as the ferment can only act so long as its atoms are in motion, so its power of exciting fermentation must cease as soon as its own decomposition is complete, and not before. Hence, a given weight of ferment can only cause the fermentation of a limited amount of sugar or any other fermentable compound.'

"On the other hand the views of Pasteur on fermentation are as follows:

"'The chemical process of fermentation is essentially a phenomenon of life: it begins and ends with it; an alcoholic fermentation without simultaneous organization, growth, and development, that is, without continuous life, is impossible.'

"He regards fermentation as a chemical process accompanied by a physiological one; the duration of life of the ferment limits the splitting up of the atoms of sugar. Liebig says there is nothing new in this view of the process. It was fully understood and explained by him in his chemical letters twenty years ago, and then, as now, he did not care to adopt it.

"'The action of ferments on fermentable bodies,' says Liebig, 'is analogous to that of heat on organic substances. Their decomposition at high temperature is always the result of a change in the position of their atoms. Acetic acid is converted by heat into carbonic acid and acetone, just as sugar is split up by yeast into carbonic acid and alcohol; the carbonic acid resultant from the decomposition of the acetic acid contains two-thirds of the oxygen, and the acetone all of the hydrogen, in the same way as the carbonic acid of the fermentation of sugar includes two-thirds of the oxygen, while the alcohol contains all of the hydrogen.

"'The formation and increase of yeast-plant is dependent upon the presence and absorption of nutritious matter that develops the living organism; but in the process of fermentation there is an action independent of, and outside of, any products that the living organism can assimilate. The vital operation and chemical action are evidently two phenomena that in their interpretation ought to be considered separately.'

"To the opinion of Pasteur, that the decomposition of sugar in the process of fermentation rests upon the formation and growth of the cells of the yeast-plant, is opposed the fact that yeast will produce fermentation in a pure solution of sugar; and as yeast consists in the main of a substance rich in nitrogen and sulphur, also containing considerable quantity of salts of phosphates, it is difficult to comprehend how, in the absence of both

of these constituents in the sugar, the growth of the plant-cells can be promoted; and it would be equally difficult to explain how the beer yeast exerts the same decomposing action upon numerous other bodies as upon sugar.

"Liebig has carried on an extensive series of researches in order to determine the action of yeast upon a great variety of substances, and he also cites the labors of the best chemists of Europe to show that his views of the action of yeast and leaven to produce fermentation is founded upon scientific principles, while the explanation of Pasteur is wanting in every element of theory and fact.

"It is so popular, not to say fashionable, to refer every vital action back to the formation of cells, and the building up of protoplasm, and to intimately connect life and matter together, so as to gradually support the doctrine of spontaneous generation, that the publication of Liebig's great paper must be looked upon as a timely protest against the tendencies of the age. And it may serve as an intimation to younger men of science, anxious for fame, that the old methods of research are sufficient to furnish us with satisfactory explanations of the phenomena of nature without the necessity of having recourse to the supernatural or to the materialistic doctrines of the so-called protoplastic school.

"The first part of Liebig's paper, which is all that has appeared, is devoted to fermentation; the second portion is to be occupied with the question of the origin of muscular force, and will be looked forward to by physiologists with great interest."

In the "*Medical Gazette*" we find a report of a case of poisoning from the use of carbolic acid upon a suppurating surface, which had nearly proved fatal. The patient finally recovered under the use of active stimulants. We copy, also from the *Gazette*, the following notice of the "*American Journal of Microscopy*," which has its local habitation in Chicago:

"*The American Journal of Microscopy* is the ambitious title of a new publication which announces its intention to 'rank

among the leading scientific journals of the country.' The original matter in the first number, now before us, is very decidedly original, and conveys information certainly not to be found in any of the standard authors on the subject; such, for instance, as that innumerable animals 'inhabit the air we breathe, the water we drink, and the food we eat. They move and have their being in sweets and sours—in the toughest flint as well as the mellow pulp of the peach. * * * * * In our own human bodies are tiny tenants—populous colonies of little inhabitants—dwelling and moving in our flesh,' etc.; that in a single drop of rain may be counted 'near a hundred playful little creatures.' One writer undertakes to educate the youthful mind in comparative anatomy by asserting the possible development of teeth in an animalculus less than the hundredth part of a hair's breadth in size, and estimates the number of air-cells in the lungs of infusoria. 'Unscientific and superstitious persons' are reassured concerning the 'red snow' of the Arctic regions, as 'the miscroscope has recently shown it to be due to the presence of a minute species of animalculæ.' We are told that the mosquito, after he has quite finished sucking our blood, 'puts the drop of poison into the place he took the blood from.' After all these exhibitions of original research, it is gratifying to learn that the conductors of the *Journal* will 'make scientific examinations for individual interests, for a proper consideration.'"

The above from the *Gazette* gives a pretty good idea of the high scientific status which this work is destined to occupy, and we should think from the above, and from our own hasty review of the work, that its editor and contributors each went daily armed with a *Craig Microscope*, ready to solve all the mysteries of the material universe.

"*The Canada Journal of Dental Science*" has an article upon "The Manufacture of Artificial Teeth," by C. Brewster, L. D. S., of Montreal, in which the author makes the complaint that the teeth manufactured now are not as strong as those which were made many years ago. Since the introduction of rubber as a base, manufacturers have not been as particular in

regard to the strength of their manufactures as they were before, when every tooth was subjected to the heat required in soldering, when brought into use.

Dr. Brewster details some experiments of a crude character which seems to indicate that the teeth manufactured by Ash & Sons, of London, are much stronger than any made in this country.

C. S. Chittenden, of Hamilton, Canada, states that if carbonate of soda (the common baking soda), is used with soap, the hands can be easily cleaned when they have become blackened and unsightly by working in the laboratory.

A large part of the April number of the *Canada Journal* is taken up in a reply to an article, or we might say to two articles, published in the *Canada Medical Journal*, by one "Bowker," reflecting particularly upon the "Royal College of Dental Surgeons," charging that the use of amalgam was encouraged and recommended by that institution. It seems that the *Canada Journal* had *room* for these articles of H. M. Bowker, but when the editor of the *Canada Journal of Dental Science* proposed to reply to Bowker's articles, there was no *room* in the pages of *The Canada Medical Journal* for any such purpose, so we have the reply at length in the *Dental Journal*. As the principal point sought to be established is the propriety of using amalgam in any case, our readers will only have to look over the journals of twenty years ago, to find all the *pros* and *cons* thoroughly discussed. In the correspondence, however, upon this amalgam question, which was furnished by "one of widely recognized ability," we find the following important *fact* noticed: "Water does not decompose mercury, silver or tin to any appreciable extent." Perhaps this *savan* can tell us what constituent elements mercury, silver or tin would be resolved into, supposing they were *decomposed*.

An editorial upon pyroxylin base speaks highly of this kind of work, but we are inclined to advise our readers to go cautiously in that direction, for fear that they may be disappointed in their expectations. We hope it will prove to be all that is claimed for it by its friends.

"*The Dental Cosmos*" for May has for its leading article a description of a case of exostosis, or cemental hypertrophy of the fangs of a lower molar tooth, the whole mass being two and one-half inches in length by two and five-eighth inches in circumference, and weighing twelve and one-half pennyweights. This article is by J. H. McQuillan, and concludes with the following remarks:

"In conclusion, it may not be amiss to direct attention to the impropriety of applying the term 'exostosis' to hypertrophy of the cementum. In taking exception to the employment of this term in connection with a tooth, it is with the desire of limiting the application of the word to its proper and legitimate sphere. I am well aware of the fact that eminent writers on surgery and dentistry almost invariably use this word in connection with the hypertrophied roots of the teeth, but that does not necessarily make it right. Correctly speaking, exostosis (from the Greek *exo*, 'without,' and *osteon*, a 'bone,') is an osseous tumor on an exuberant growth of osseous material, on the surface or in the internal structure of a bone, including the enlargement of a part or the whole of a bone.

"It will be seen by this definition from 'Thomas' Medical Dictionary,' that to prevent confusion the term should be restricted to bony growths alone. It may be said that the structure of cementum is so closely allied to bone that it is an attempt to establish a distinction without a difference.

"Any one who has used the microscope in the examination of bone and cementum, is aware of the fact that there are characteristic features belonging to each which will enable those who are familiar to distinguish one from the other with ease — the lacunæ, canaliculi and Haversian canals being invariably present in bone, while lacunæ and canaliculi only are found in cementum. It may be said that this is only a difference of degree, but it is just such a difference as to justify the distinction made, and enamel, dentine, cementum, and bone, are but differences of degree in which an animal basis is impregnated or united with mineral constituents. The all-important point which I desire to establish in objection to the use of the term under consideration, is that this

hypertrophy is an enlarged growth of one of the dental tissues (cementum), and not from bone. This fact has not only a bearing upon a correct apprehension of the pathology of the case, but also upon the character of the operation demanded in the removal of the abnormal structure."

We would merely draw attention to the following paragraph, in the above quotation: "The lacunæ, canaliculi and Haversian canals being invariably present in bone, while the lacunæ and canaliculi only are found in cementum."

As the whole article quoted is based upon this assumed difference between bone and cementum, we will spend a moment in examining the "characteristics" of these divers tissues as described by the above author.

In the first place, then, we will premise that the Haversian canals are by no means always present in bone. Haversian canals are only found when the plates or laminæ of bone are of some considerable thickness, in which case they are required for the purpose of conveying nutrient material into the substance of the bone, so that Peaslee, in his work upon Histology, says that no Haversian canals are found in bones which are less than $\frac{1}{85}$th of an inch in thickness, and moreover, in bones which measure only from $\frac{1}{6000}$th to $\frac{1}{4000}$th of an inch in thickness, even lacunæ and canaliculi are wanting. In the thinnest plates of the ethmoid bones, and in the oscicles of the ear, no Haversian canals exist, whilst Peaslee states that bones without even lacunæ or canaliculi, can be found in the os unguis of the mouse and certain small birds.

As bones exist without Haversian canals, etc., these cannot be considered essentials in true bone. Therefore, we cannot legitimately argue that cementum is not true bone, because it is generally found without the Harversian canals.

Mr. Tomes calls cementum, "a tissue which offers no striking character by which it can be distinguished from ordinary bone," and for a full description of cementum he refers to Mr. Shelly's paper upon this subject, published in "Transactions of the Odontological Society"; and further on, in relation to the development of cementum, he remarks: "On comparing the statements made by Mr. Shelly with those contained in the previous extract, it will

be seen that there are no essential points of difference recognized in the mode of formation of bone and cementum." But Haversian canals *are* found in cementum as well as in other bones, whenever the conditions are such as to require them for the purposes of nutrition. Mr. Tomes says, again, "The occurrence of vascular canals (Haversian canals) is to a certain extent exceptional, being dependent upon the presence of a larger amount of cementum than is usually found in perfectly healthy teeth."

Mr. Owen says, "Cement always closely corresponds in texture with the osseous tissue of the same animal; and wherever it occurs of sufficient thickness, as upon the teeth of the horse, sloth or ruminant, it is also traversed, like bone, with vascular canals."

Peaslee, in his "Histology," says, "The cementum is a layer of true osseous tissue covering the fangs and necks of the teeth." And again, "It rarely contains Haversian canals and vessels."

Now if there is no essential difference in the structure, or in the development of cementum and other bones, we think it will not be absolutely necessary to change an accepted nomenclature of exostosis, when applied to cemental hypertrophy, or more properly speaking, to cemental hyperplasia.

The next article in the *Cosmos* is the conclusion of the paper entitled, "Notes for a Memoir on the Pathology of the Teeth." We pass on to the next article, by W. E. Driscoll, upon "What I know about Chloroform." Dr. Driscoll states that he has used it as a *dernier resort* in cases of sensitive dentine, but he is evidently aware that in so doing he is treading on dangerous ground; and although we publish in this number of the JOURNAL, an article recommending the use of chloroform strongly, we desire to say that in our opinion the risk is too great for any practitioner to take, when we only have sensitive dentine to contend with.

Following this we have an article by Professor Stelwagen, in which he discourages the indiscriminate use of anæsthetic agents in extracting teeth, and by implication, the use of these agents in cases of sensitive dentine.

THE KANSAS STATE DENTAL SOCIETY.

LAWRENCE, KANSAS, May 5, 1871.

EDITORS MISSOURI DENTAL JOURNAL:

The dentists of this State met in convention on the 2d of May, 1871, and organized a State Dental Society. Dentists present: Dr. W. H. Marvin, of Topeka; Dr. J. H. Sawyer, of Atchison; Dr. E. C. Fuller, of Fort Scott; Dr. A. M. Callahan, of Topeka; Drs. J. B. Wheeler and J. D. Patterson, of Lawrence.

A permanent organization was effected. Name — *The Kansas State Dental Society.* Code of Ethics adopted was that of the American Dental Association. Constitution and By-laws same as that of standard local societies in other States.

Dr. J. B. Wheeler was elected President; Dr. W. H. Marvin, Vice President; Dr. J. D. Patterson, Recording Secretary: Dr. E. C. Fuller, Corresponding Secretary; Dr. J. H. Sawyer, Treasurer. Dr. E. C. Fuller was elected delegate to the American Dental Association for 1871.

A vote of thanks was tendered Dr. Marvin for inaugurating the movement for organization.

First semi-annual meeting will be held at Topeka, commencing September 12, 1871. Annual meeting at Atchison, May 2, 1872.

After all necessary business was transacted an irregular discussion ensued — exchange of opinion on different subjects of interest to the dentist.

Members were highly gratified with this inaugural movement to place the profession in this State with that in older States, by thus organizing on *a solid basis* a State Dental Society.

Cordial invitation is extended for co-operation by the profession, especially in our own State.

The Secretary was instructed to furnish reports of this meeting to the leading dental journals of the country. Society then adjourned to meet at Topeka on September 12, 1871.

J. D. PATTERSON, *Rec. Sec.*

OBITUARY.

Dr. H. E. Peebles, a notice of whose death appeared in the March No. of this journal, and whose photograph appears with present number, was born in Virginia in 1812. He removed from thence to Southern Ohio, where he commenced the study of Dentistry. Upon coming to Missouri he entered upon the practice of his profession at Lexington, and after having won an enviable reputation in that section of the State, he removed to St. Louis, where he remained in active practice until a short time before his death. Dr. Peebles was a man of great energy of character, and having early imbibed correct views in regard to dental education, he entered into the discussion of the educational questions of the day with spirit, and ceased only with his life to exert all his influence for bringing about a higher grade of literary and scientific attainments for the members of the dental profession.

When the Missouri Dental College was organized, he entered upon the duties of a teacher in that Institution, which he filled with credit to himself and to the college, until his failing health admonished him of the necessity of resigning a position, the onerous duties of which he was no longer able to perform. The organization of the Missouri State Dental Association was due to his almost unaided efforts, and for many years he was an active member of the St. Louis Dental Society, and of the Western Dental Association, and also of the National Dental Association.

No member of the profession could have been taken from its ranks in Missouri, whose loss would have been more severely felt. He leaves a family and many friends to deplore his loss; and an example whose benign influence shall be felt through many a coming year. "Blessed are the dead who die in the Lord for their works do follow them."

J.

RESOLUTIONS OF CONDOLENCE.

Editors Missouri Dental Journal:

At the seventh annual meeting of the Illinois State Dental Society, *Resolutions of Condolence* were passed upon the death of the late Professor Peebles, of St. Louis.

C. Stoddard Smith, *Sec'y.*

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] JULY, 1871. [No. 7.

ON FERMENTATION.

By PROF. A. W. WILLIAMSON, F. R. S.—Before the Society of Arts.—Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 208.)

First, I will take the cause of alcoholic fermentation, as being the case best known. The ferment consists of little cells—which I hope I shall be able to show you at our next meeting—each one containing several compounds, but itself a living being. I will not say at present whether they are animals or plants. When you have these little organisms in water, or sugar, or in any moist substance, they are constantly and of necessity undergoing decomposition. You may arrest the decomposition by various agents, but if you do so, you kill them, or suspend their activity as yeast. No case is known to us of their acting like yeast without undergoing at the same time a process of chemical decomposition,—being broken up into simpler substances than those which were contained in them. I pointed out, last week, that the sugar which is being decomposed by the yeast is by that process being broken up into substances which were contained in it, and that was what Liebig noticed. He said that

this yeast is a substance which tends to decompose, — it is breaking up into simpler substances, and it induces in these particles of sugar, which are in contact with it, a decomposition similar to its own. The action which it is undergoing is contagious, and passes over to the contiguous particles of sugar; and he adduced cases like that of oxygen, as affording analogies among simple well known bodies. I think what I have said with regard to the case of oxygen, will be sufficient to show you that in those simple cases the idea of contagion is certainly not applicable.

A foreigner, who was describing sometime ago the luxuriance of the crops in America, spoke of a bushel of *mice* being sown in a field, and a hundred bushels of *mice* being reaped. Of course, what he meant to say was *maize*, or Indian corn; but I am reminded of that anecdote by the necessity I am under for a moment, of asking you to consider for a while, some living beings under their general functions only. Suppose you had a bushel of actual English mice, and you put them into a granary full of corn. There clearly would soon be a great change. You are supposed to know nothing more about the particular organization of these little beings, than you know about the particular organization of the little yeast cells. You know that these little things eat grain, and that in place of the grain which they eat, there appear various products of decomposition, which can be easily collected and examined. They give off carbonic acid, and so forth, and if you examined the state of that granary after a time, you would find a chemical change, or rather a set of chemical changes, going on in the organisms of these mice. The substance of which they consist would be actually wasting away; they would be giving off carbonic acid, and nitrogenous and other products. And if you also examined the state of the corn which was there at first, you would find that it finally passed over into these same products; and I say that the theory of contagious action is as much applicable to the action of the bushel of mice in the granary full of wheat, as to the action of the yeast cells upon a solution of sugar. There is in the one case, as in the other, an assimilation by the living organism of the material upon which it acts. The materials undergo certain

changes, of which the general results are known to us, but of which the particulars are, I may say, in the main almost completely unknown. As to the processes by which these products are formed, it is as well to say that we do not know them. We know a little here and there about them, but it is nothing compared to our ignorance; therefore the resemblance is the more striking, and if we were to believe in the contagiousness of chemical action as applied to the case of the assimilation of sugar by a ferment, and say the ferment gives off alcohol and carbonic acid, and that sugar is also resolved into alcohol and carbonic acid, we should really be describing in its general features, a process analagous to that which I have just now mentioned; such a general analogy would be readily admitted by those who go into the particulars of the process, but I think it is of particular importance, to have in addition to it something more practically useful, to guide us in understanding chemical reactions. For that purpose I will take one or two chemical reactions of an exceedingly common kind. For instance, I will again take that chromic acid which I just now employed. Here you see is the green residue which I told you would be produced; I again take some of this chromic solution, throw some of it into water into this jar, so as to visibly tinge the water red: I will slightly acidulate the liquid by oil of vitriol, and I will then pour into the mixture (which I will describe as chromic acid dissolved in water, for the potash which was present is taken away from the compound by the sulphuric acid), a substance which I will merely describe as being greedy of oxygen, sulphurous acid. If Liebig's theory of contagious action were generally true in chemical action, you would no doubt expect that this sulphurous acid, in taking up oxygen, would make the chromic acid also take up oxygen. It is quite possible for the chromic acid to do so, for that blue substance which we had in this jar at first was nothing but chromic acid with oxygen added to it. But instead of this, we shall have at once a reduction of the chromic acid to deep green, which I dare say appears to you almost black. It is precisely the same thing as that pale, dirty green which you saw before, but in its concentrated state. There is no oxygen taken up by the chromic acid,

but it at once loses oxygen. This sulphurous acid wanted to combine with oxygen, and it tore away at once some of the oxygen from the chromic acid, and there was in this chromic acid a process, not similar to that which the sulphurous acid underwent, but a process precisely opposite to it—one combined with oxygen while the other lost oxygen,—and if you examined the liquid, you would find that the sulphurous acid which took part in the process, and has taken up oxygen, is now in the form of sulphuric acid. Again, I have here some granulated zinc, which will very easily evolve hydrogen, particularly when its activity is stimulated by throwing a little oil of vitriol on to it. After adding a little water, I will throw in a little oil of vitriol, so as to get an evolution of gas. Then I have here a solution which I think must look black to you, except at the edges, which is a solution of a beautiful salt called permanganate. It is used for deodorizing certain fœtid water, and I might compare it to the chromate I was using just now. It consists of an acid of the metal manganese. If I throw some of that into the mixture which I have just prepared, and leave it for a short time, and then examine it, we shall find that, instead of being induced to give off hydrogen like the other body, which is doing so vigorously, we shall find that it will do the opposite, and will combine with hydrogen; and the color which belongs to it, and which can be recognized so easily, will disappear, because hydrogen will be taken up by its oxygen; and it will be reduced and brought down to a substance containing comparatively little oxygen. There, again, as in the previous case of the chromic acid, we find that there is a kind of chemical polarity in the general mode of action, that the one substance acted upon does precisely the opposite of the other. There is no tendency in this case to do the same thing, but the two substances acting upon one another do precisely the opposite, the one taking up what the other loses. Not only is this the case in the instance of the action which I have mentioned here, but in a great number of other cases of considerable interest and importance,—bodies which act chemically with considerable energy when allowed to do so, are prevented by others from so doing when those others are trying

to do the same thing. If, for example, we put metallic copper into nitric acid, the copper would dissolve with immense energy; it would undergo what I might call a process of combustion. Again, if I put mercury in contact with the acid, the same thing would occur; it would be dissolved almost as rapidly as the copper. But if I put the two together into nitric acid, the copper prevents the mercury from undergoing combustion; and so far from encouraging it to do the same thing, it actually takes from it the power which it possessed before of undergoing a combination of that kind. And more than that, if I take mercury which has been burned—a solution of mercury in the form of corrosive sublimate,—and put copper into it, the copper will actually unburn it, or make it come back again from the point at which it had got, and throw down the metal. You can see the process which takes place; on putting a strip of clean red copper into the solution, it becomes grey, and throws down the mercury from the solution. So far from encouraging the mercury to oxydation, it makes it do the opposite to that which it otherwise had a tendency to do.

Again, I will take some of this solution of copper—it ought to be some of the very solution which is being made here, where copper is being dissolved at the expense of mercury—and if I put into it a piece of common iron, perfectly clean and white, it will very speedily combine; and I cannot express its functions in combining better than by saying that it will make copper uncombine, for the copper which was burnt is now being unburnt.

If we go carefully, with the knowledge of their particulars, through the best known chemical processes, we find that there is, as a rule, a force at work which I might describe as polarity —a tendency among contiguous particles which are acting on one another to assume functions which can be best characterized as being opposite to one another. Whatever the one is doing, the other is doing as nearly as possible the very opposite of it, and any tendency to do like work I know not of. There are, however, cases which would appear to be favorable to the notion of contagious chemical action. If I blow out that gas-burner, still letting the gas escape, and then bring near to it a burning

splint, it will set fire to the gas, and the same with the candle-wick if I bring it close to a burning match — the match, which is burning, communicates to the wick the process which it is undergoing, — but the explanation is this: it does so merely because of the high temperature which it has attained. If by any other process, such as concentrating the rays of a powerfully heated surface by means of a lens, I raise the temperature of the gas to that point at which it is capable of combining with the oxygen of the air it will do just as well. The accident that the high temperature is communicated by the burning splint has nothing to do with the process.

[*To be continued.*]

THE FORMATION OF FAT.

Toldt has recently published in the Transactions of the Vienna Academy an essay on the Physiology and Histology of Fat. In opposition to the statements of Virchow, who maintains that fat-cells are to be regarded as the cells of connective tissue filled with an oily fluid, and are therefore constantly associated with this tissue, Toldt gives as the general results of his inquiries upon the intra-spinal fatty tissue that this, at least, is an organ of a peculiar nature, which neither in regard to its structure nor function can be included amongst the connective tissue formations. In order further to demonstrate that adipose tissue is independent of connective tissue, he refers to the characters and relations of fat in the Batrachia. The masses of fat that surround the uro-genital apparatus of these animals in the larval state consists of large, round, transparent, nucleated cells, not separated by *any* intervening substance except bloodvessels. Passing to the mammalia, he points out that the first formation of fat in the embryo occurs around the kidneys, and thence gradually extends into the connective tissue of the mesentery after birth. He considers a

strong argument in favor of the independency of the adipose tissue to be the fact that it always has, down to its smallest lobules, its own proper and closed system of bloodvessels, which, it is curious to observe, very closely resembles that of the acinous glands. These researches of Toldt enable us to explain the absence of fat in regions where everything appears to favor its formation, as in the sub-muscular connective tissue of the intestinal canal. It explains also the persistence of the tissue, with its characteristic features, even when all the oily matter has been removed by absorption. Whilst fully concurring in the general statement that fat-cells possess in mature adipose tissue a distinct membrane, he differs from Czajewicz in maintaining that when first formed they are destitute of a membrane, this only becoming visible in the latter embryonal periods. The minute masses of protoplasm they contain, however, remain throughout life. He makes an interesting observation to the effect that spring frogs that have fasted through the winter, and are excessively lean, present fat drops in which no membrane is distinguishable, but which, reduced to their protoplasmic primary mass, possess the power of amœboid movements. From the consideration of these facts, M. Toldt has arrived at the conclusion that the protoplasm of the fat-cells, when supplied with sufficient nutriment, is capable, like a gland cell, of forming fat as a kind of secretion; and, inversely, when the consumption of oxidisable material exceeds the supply, it possesses the power of using up the stored-up fat and discharging it into the blood. The mode in which fat is laid up has also been investigated by Fleischer, with a view of determining whether, in accordance with Liebig's idea, the amylaceous compounds ingested are converted into fat directly; or whether, as Voit thinks, the fat consumed in the economy is derived from the fat of the food, and that the amylaceous compounds are only serviceable as readily combustible compounds, by means of which the fat developed from albuminous compounds, and already present in the body, are preserved. The results of his investigations on cows, which were both numerous and extended over a long period of time, were on the whole unfavorable to Voit's views.—*Lancet.*

CONTOUR FILLINGS.

By Edgar Park. Read before the Missouri Dental Association, June, 1871.

Severe criticism has been so freely indulged in by many, upon this subject, that perhaps it may not be amiss to expend a few moments in considering the relative merits of the contour operation where indicated, and others which may be performed.

This operation is indicated where the loss of a portion of the tooth has occurred.

There has never, to my knowledge, been a variety of opinion concerning the advisability of restoring the general contour in cavities having four solid walls to retain the plug. In simple, and even in compound fillings, I don't remember to have heard any objection urged to restoring, as nearly as possible, the lost portion; on the contrary every good operator recommends filling all these cavities sufficiently full to be susceptible of being finished in such a manner that the surface of the filling shall be continuous with the surface of the tooth.

But in cases where a considerable portion of the crown of the tooth has been lost, arises the question, as to the advisability of contour fillings.

I imagine no one will dissent from the statement, that in dental operations the great design is *utility*, which in the teeth, consists in the preparation of food for deglutition and digestion; in their instrumentality in the enunciation of sounds, and in preserving the natural expression of the face. To preserve the utility of each defective organ, it should be operated upon in a manner to preserve as nearly as possible the purposes for which it was designed—the teeth being doubtless fashioned by nature upon the most desirable plan for their several functions. To retain then as great an amount of the natural structure as is possible, in a sound healthy condition is demanded.

A full set of perfectly formed, regular, natural teeth, is un-

doubtedly the best masticative apparatus that can be devised; and as a personal feature it cannot be improved upon — unquestionably a better model to follow than any idea of our own.

In a well regulated mouth there is no more masticating surface furnished than is designed for use, or than is necessary to equalize the process of digestion with the other organs, whose functions follow that of the teeth. Contour filling is therefore indicated in broken down molars. Indeed its necessity should be recognized in all cases where the tooth can be retained in a healthy condition.

In the bicuspid teeth, where serious decay has occurred in the proximal surfaces, is it especially indicated. Not only is one bound to furnish the patient his full allowance of masticating surface, but for the benefit of the individual teeth, their contour should be restored. I think it is safer to say that more operations fail in the approximating surfaces of the bicuspid teeth, than in any other location in the mouth, and in many cases where the utmost care has been taken, frequently the failure is attributable to the cause designed to prevent it — the free space so frequently left with the idea that through this, these teeth may the more easily be kept clean. This I apprehend, is a mistaken theory in operations of this nature. The free use of the file between these teeth is almost universally necessary in order to remove the frail margins of enamel and secure firm reliable margins. If these cavities are filled and finished squarely across, the crowns frequently approach each other until the surfaces of the plug, dentine and enamel are in contact, when decay will almost certainly again attack them at some point of contact. If you will call to mind the shape of these teeth and their disposition in the alveolus, it will be readily seen why this is more likely to occur in these than in other teeth. A better method to adopt in filling such teeth is the one now advocated — after having filled the cavities, continue the operation until the contour of the teeth is restored, and the exposed dentine and enamel rods perfectly protected. After finishing, the convex surfaces of the plugs are in contact, rendering impossible the calamity mentioned above.

Coming now to the incisor teeth, this mothod of operating —which has been so unjustly and bitterly denounced by many as unsightly, fancy operations, advertisements, etc., etc. — I urge again the question of utility. This method of treating results in fewer objections than any other. But one can be urged against it (on the part of the patient). The exhibition of metal is objectionable, that is all, the tooth is stronger, more serviceable, and will be preserved much longer than by means of any other operation.

In these operations gold is the only material with which most operators can produce satisfactory results. Of this there are many preparations. To enter into a discussion as to the relative merits of the different preparations is not in the province of this paper. Perfect operations may be produced with each by the exercise of sufficient care and skill. Experiment on the part of each operator is a more reliable method of determining which preparation is most desirable in his hands, than in depending upon what any man says.

I shall not occupy your time with any elaborate details of methods of performing contour operations upon various teeth, presuming each to have a method of his own, of much greater value to him. However, a paper upon this subject would perhaps, be unnecessarily incomplete did not the writer give some general ideas of the manner in which he would proceed in a given case. Suppose the right central incisor to require this operation: with a file I should reduce the fractured and uneven edges to a strong, regular margin, affording material sufficient to furnish a reliable wall to the cavity, which now is to be made the principal retaining point for the superstructure. Now excavate, of course removing all disintegrated and unsound dentine, being careful to avoid the sacrifice of an unnecessary amount of dentine for the sake of securing deep undercuts. They are unnecessary and even objectionable, inasmuch as they materially weaken the walls Having prepared the cavity in a manner to afford it the greatest amount of strength; a very fine file or polishing stone should be used on the margin to which the gold is to be adapted. The indispensable rubber dam is next adjusted over four or five teeth

—the centrals, laterals, and right cuspid—inserting a wooden wedge between each two of the exposed teeth, beginning between the centrals. By the support thus secured from adjoining teeth the force required to fill is distributed among several teeth, and the severity of the malleting process is astonishingly lessened. Thoroughly dry the cavity, and through a magnifying glass make a last observation. Being satisfied that the tooth is properly prepared, we proceed to introduce the gold—avoid haste—thoroughly impact each piece of gold before introducing another. The use of very small delicate points I find indispensable. Having perfectly filled the cavity, commence extending the gold over the cervical margin, building upon the filling against the walls from without and within. The force should be directed at an angle upward against the plug in every direction, looking toward its surface. If this is done the impaction of the gold will be finished at the mesial corner of the filling. The gold introduced we have but to finish. This is done by all alike I presume—by means of files, burrs, stone, polishing powders, etc. No less care, however, should be taken in the last steps of the operation than in the first. The margin of the plug must be polished to a perfect surface with the margin of the cavity. The secret of success in these, as in all other fillings, is thoroughness. To produce perfect finish upon an imperfectly introduced plug is impossible. No amount of burnishing and polishing will conceal the faulty operation from the critical eye. *Ohio. Dent. Journ.*

SMOOTH POINTED PLUGGER vs. SERRATED POINTED PLUGGER.

By George O. Howard, Galena, Ills.

For twenty years, instrument makers, directed by our most prominent dentists, have given considerable attention to produce pluggers with a delicate and regular serrated point. Much time

and money have been spent for that purpose, and the best mechanics employed, and beautiful results have been obtained; Varney's plugger for instance. They are perfect in form, and with serrations so delicate and regular as to suit the most fastidious, with a price for them that surely places them beyond the reach of some of us; the cost, however, is the serrating of the point.

We, in our humble sphere, do not expect to revolutionize the ideas that have been involved in these twenty years of thought and labor; but in our humble way will ask a few questions and answer them as they have occurred to us; theorize and give the results of some of the experiments we have tried.

Are serrated points superior to smooth points for packing gold, if so, in what respect?

We have thought of, experimented, and practiced with both, and have been so thoroughly convinced that smooth points are the best, that we cannot to our mind offer any sound argument in favor of the serrated points; however, others claim that they are absolutely necessary, that with them only can gold be handled easily in the cavity, that the filling must be more or less rough to have the gold adhere and cohere perfectly and this can only be done with a serrated point. That by using them we produce a succession of wedgings in the gold, thereby making our work stronger, especially in contour filling, and that by using any other kind of pluggers a failure will be the result.

With due respect for the advocates of the serrated points, we will respectfully decline to accept their arguments in favor of them; we do not believe that serrated points are necessary to handle the unpacked gold in the cavity; we know by a year's practice with smooth points that we can handle our gold with them as easily as with the serrated points, for in moving the unpacked gold about in the cavity with the serrated point, we do it with the edge of the face and not with the face. We find this is done just as easily with a sharp edge smooth face as with the other. We will refer to this point again.

We do not believe it necessary to have the surface of the packed gold rough in order to obtain the most adhesion and cohe-

sion, such as is produced by the serrated point. On the other hand we think the serrated point is the direct cause of our filling not being perfect. We mean by a perfect filling one that stands for time just as we left it, and does not roughen upon its surface. We theorize thus: at any and every stage of the operation the gold that is packed with the serrated point presents a serrated surface, it is a counterpart to the serrated point, or we may say a surface of hills and valleys, if the plug has received justice from the hands of the operator. It is hard, the hills and valleys alike; when we lay on the next piece of gold we can easily conceive how impossible it would be to place the serrated point on to it so as to exactly correspond with its counterpart in the gold. If any one doubts this let them try to do it and we are sure they will be convinced that we are right. Instead of the gold being pressed into all these little valleys, it lodges upon some of the little hills, and some of the valleys are shingled over. In using the smooth point, the packed gold at every stage of the operation is perfectly level and smooth, no valleys to be shingled over, therefore it must be more solid, and if more solid it must be more coherent. We heard an honored member of our profession say not long since, when we were arguing this question, that he did not shingle over any of these little valleys, that he beat down the little hills. We would rather he would do it for some body else than for us; we have not succeeded in doing so only in filling a cavity in a steel plate, and then only by a tremendous blow from the mallet, sufficient to ruin almost any tooth.

Here we will refer again to the handling of the unpacked gold with the smooth point. The packed gold being at all times level and smooth, the unpacked can be moved across it without catching upon any of these little hills, as it would if the serrated point was being used. As to making the strongest work the smooth point has the decided advantage, because it produces a more solid plug. There are no flaws to weaken it as there is in one packed with the serrated point. This assertion is not theory alone, as we think we know positively that it is so, having made experiments to prove it, two of which we will give.

We made two steel plates, fitted them nicely to gether, held by set screws with a V shaped cavity, between them. The plates were hardened so that there would be no spring to them; we then filled this cavity twice with gold, using to pack the first a smooth point, and for the second a serrated point, both pluggers being exactly the same diameter at the point, and the same length. The mallet was hung on a pivot through the handle and dropped from a given point every time. William's No. 60 gold was cut into pieces of the same size for both experiments, and the same number of blows with the mallet given to each, with the following result: The one packed with the smooth point weighed 17¼ grains, and the one packed with the serrated point not quite 16 grains, over one and one-fourth grains in favor of the smooth point. For non-conclusive evidence we heated the plugs red hot and dropped them into oil and let them remain there for a few days, and then rolled them into plates, with exactly the result we anticipated, viz: the one packed with the serrated point was rough with innumerable holes through it, while the one packed with the smooth point was a perfect plate.

Another experiment was then made more particularly to test the strength of gold packed by the two methods, and this proved to us that gold packed with the smooth point is better in contour fillings than when packed with serrated points. A cavity was drilled between two steel plates, a line in diameter, and one half inch deep; two plugs were then packed into this in the same manner as in the other experiment, one with the smooth point the other with the serrated point, and ends of the plugs were then rested upon one-sixteenth of an inch uprights, and weights were then suspended from the centre of the plugs by a wire, and while twenty-four pounds only bent the one packed with the smooth point, it broke the other. The oil test was then tried with the pair of plugs, with the same results as in the other case. This to us was conclusive evidence that for a coherent, strong filling, we must use the smooth point.

We see from a letter of Dr. A. A. Blount, M. D., and D. D. S., of Springfield, Ohio, to Dr. Cushing, of Chicago, that he claims by using smooth points a lateral expansion is obtained, a

result we have sought for in vain in the serrated point. We have not observed this as yet in practice, but can easily theorize that it is so, for in striking the smooth-pointed plugger with the mallet we produce the same effect upon the gold that we would if we were to strike a piece of malleable iron with a hammer, viz: make it thinner, and of course expanding it laterally, while with the serrated point we grapple the gold and draw it together in little hills besides cutting it.

Dr. Blount calls his instruments "planishing points." We understand by that the same as we have described, flat and smooth with square edges. It has been suggested to us that a "planished point" meant one that was oval and smooth. If it does, we think the "planished point" is wrong, for in using them we produce a succession of concave pits in the gold, and if they are shingled over the result would be worse than from the use of serrated points, because the pits made from the serrated points are not so large as those made by the oval point. We think the point for general work must be square edged. But, in approaching the "dentine" or "enamel," we would recommend an instrument to be used that had its edges rounded a little, so as not to injure the "dentine" or "enamel."

We advise every dentist who reads this, to try the smooth points and be astonished with the results, by making the most beautiful work they ever made. After using them a year, we can candidly say that in our opinion we would be guilty of doing a wrong to our patients if we were to use any other than the smooth pointed plugger in filling their teeth with gold.

GOLD FOR FILLING TEETH.

[The following discussion took place at a "Meeting of the American Society of Dental Surgeons held in Philadelphia, August, 1851." Copied from the "*Dental News Letter*," of that date.]

Dr. White.—I wish to call special attention to the manner in which Dr. Arthur uses gold for filling the teeth.

Dr. Arthur.—I have for some time been making experiments

with gold for filling the teeth, and have fallen upon what I regard a very great improvement. I have no doubt gentlemen will be very much surprised at it, and will be doubtful of its utility. I use gold never finer than No. 30, and from that to No. 50, but I generally rely upon No. 30. I use this not only for strong but for frail and most delicate cavities. By using this I can do business about one third greater in amount, and not only as well as when I used finer gold, but a great deal better. This is well worth the trial, and can be easily tested. The manner in which it is used is essential to success.

It is well known that No. 15 has been found very harsh and unmanageable, and so it is if the gold I use is folded even once. I take simply a slip of the gold, nearly or quite the size of the cavity, and I generally use very small instruments for condensing after the gold is introduced. I don't know, however, that I have made any material change in my instruments since I commenced to use this thicker gold. I have found gold of this kind, in my hands, more manageable than any other. It is obvious that the surface of the filling with this gold must be better—there must be a fewer number of edges, and it will take a better polish.

President.—I don't know whether any one is present who was at a meeting at which I spoke of the gold used by Waite, of London. He was the Hudson of England when I first resided there. I thought the stoppings from his hand were different from others, and felt anxious to know how he made them so solid; I made all the enquiries I could outside of his house, then I went to his house, and his brother brought into the room where I was, a part of a sheet of gold which was about the thickness of the lead which lines the China tea chests. He said there was but one man in London that could prepare gold in that way—it was as soft as the lead itself, and I have often wished that I could find such, but I never could. This corresponds with the remark of Dr. Arthur. Some years ago a very ingenious man, who had something to do with the invention of the cotton gin, took it into his head that he could do much in the way of saving teeth. He drilled into the tooth, then cut a screw on the end of a gold wire

and screwed it into the end of the tooth and cut it down, and it was one of the finest fillings I have ever seen.

Dr. Arthur. — I have used gold from several manufacturers. That which I now use I get from Abbey & Son. I find that the gold produced by them is generally of uniform quality at least. I do not wish to make an invidious comparison between the gold made at this establishment and that of other manufacturers; but it is of great importance in using gold of this kind that it should be of the best quality, and perfectly annealed. I would certainly advise any one who is disposed to use the gold of the kind I propose, if they are not satisfied on the first trial, to use that of several manufacturers before they throw it aside.

Dr. Allen. — I have invariably used gold as high as No. 12, and prefer it, but I am the only one that uses it in our city.

Dr. White. — I have used gold that is very heavy, and very light, and where we had to double the sheet upon itself, I am sure all must admit that it must leave a little opening and must become a little hard, so that it takes more pressure to accommodate it to the cavity — hence in a great many thin cavities I have used No. 3.

I will cite the treatment of a case in point. A lady had a front incisor filled three or four times, that was decayed from the outer edge, leaving nothing standing except the enamel posterially and at the cutting edge. It had been filled several times in three months, but carefully, for fear of breaking. The last dentist, a gentleman in practice from twenty to twenty-five years, told her it was impossible to fill it without breaking. Some one induced her to call upon me, and I had some of this thin gold which I put into the cavity with gentle pressure. Having removed the decay the cavity was larger than before. The plan I took to cleanse it was one suggested by Dr. Williams. After removing the principal part of the decay, I worked in with a small instrument and cotton, then I put this fine gold in till the cavity was filled ,until I came within the thickness of the enamel to its surface. There was only now a small cavity and this I completed with No. 4. The lady is now a resident of your city. She was absent one year, and upon examination, the tooth ap-

peared as perfect as on the day she left. I merely state the case to show that very light gold is sufficient to accomplish the end desired; but whether heavy gold would have accomplished the same end I know not. I have tried No. 50 in a few similar cases, and I believe I made very respectable fillings, but not so good as with gold that I was accustomed to.

Dr. Arthur. — I have found that No. 30 worked a great deal better than No. 50, so much so that I have discarded the latter.

Dr. Dunning. — I generally use No. 4, and would like to get No. 3 if I could.

Dr. Arthur. — It must be remembered that the point on which the principal advantage depends, is that it must be used in a single strip and not doubled upon itself.

Dr. White. — Is it not being doubled while being put into the cavity? When you put the gold in the cavity where you want it, does it remain there?

Dr. Arthur. — It is not a half dozen or more surfaces folded together to be condensed afterward, but is condensed, fold after fold, as it is put into the cavity to be filled. But the utility of gold in this form can only be tested by actual trial.

Dr. Westcott. — On the point of keeping the filling where you put it, I will make a single remark. I have been much in the habit, for two or three years, of filling teeth with both hands at once. I had never done it or seen it done before. I manage to hold my napkins in a way that I can fill with my left hand and use two instruments, where the cavity is of such a shape that it is important that you have one point packed thoroughly, so as not to have it come out again. It is very risky if you have a piece tumble out several times. You get it hard by the working. I use only one hand for filling, and the other for holding it precisely where it will be wanted. I think that every dentist will find that he can do more in that way than he can imagine. This is not one of those cases where you are under the necessity of hiding from your left hand what your right doeth. When there are large cavities, I uniformly employ an assistant. The idea of keeping the foil where you put it is important, with bicuspides particularly, and those teeth where the cavity is long and narrow.

Dr. Foster. — I invariably use No. 4 gold foil in all cases — large as well as small cavities. In some cases I find it extremely difficult, even with the most malleable foil, to keep it where I place it. If I have to use a different foil, I shall have to learn my lesson over again; for, as I use it, it must be rolled together, and it is important that I should have the most malleable foil. I have tried, repeatedly, in large cavities to use thicker foil, thinking I might get along faster; but it rolls about and gets out; and I now invariably use No. 4.

Dr. J. Tucker, of Boston. — I have used nothing but No. 4 for the last fifteen years, except where other has been sent to me for trial; in such cases I have always failed and given up.

Dr. Arthur. — The kind of gold I have recommended could not be used in the manner described by Dr. Foster.

Dr. White. — I would like to state in what manner I use it. For general use, I take a strip of gold and roll it together spirally. I use No. 4 and No. 6, pretty equally divided. If I can deliberately press upon the tooth, I use No. 6, but in lateral cavities I use No 4. If the cavities are very large I use pellets. I take a straight and narrow watch spring, to which I have added a little round piece of wire, so that I can turn it with facility; I fold it on this watch spring flat; this facilitates my rolling. In some few cases I use it in that form for small cavities. In this way, it is folded so that every leaf is in close contact, and the atmospheric air can be pressed out better than if it is folded.

Dr. Arthur. — Gentlemen may have been in the habit of using the gold of the ordinary number in a different way from what I have done. I almost invariably folded it in strips on itself. This, it will be seen is a considerable step toward using the thicker gold, which I propose. And it may not, therefore, be found, at once, so advantageous in the hands of others as I have found it. But I am convinced that, if it is fairly tried, it will be found very useful in many cases, even if it should not be adopted for general use.

KELLNITZ DIAMOND CEMENT.

The proprietor of the above makes great claims for this preparation, but having tried it I am quite disgusted, having paid three times as much for a bottle, as is asked for Smith's "Ox. Chlo. Zinc," or the "Osteo Plastic," to both of which I consider it very much inferior. Several of my friends have also tried the bottles which they purchased of Kellnitz himself, and are equally dissatisfied. Specimens of all the above, made up and laid away to harden, show Kellnitz's articles much more porous and softer than the others.

This warning, in season, will save the readers of the JOURNAL more than its subscription price for one year, which by the way, I would be glad to receive from all who are in arrears. — CHASE.

JOURNALISTIC.

In "*The St. Louis Medical and Surgical Journal*" for May, we have reported a somewhat remarkable case of extra-uterine fœtation. It was a twin pregnancy, one fœtus being in the uterus and the other in the cavity of the abdomen. At the full term the mother was delivered of a healthy child. This occurred on the 3d of February last. On the 14th of the same month Dr. Pollak was called to see the patient, who was suffering from "cholicky pains in the right iliac region, with torpidity of bowels and rectal tenesmus."

Upon examination extra-uterine fœtation was diagnosed. The woman was able to be up and attended to her ordinary vocations. It should be remarked that the woman was attended by a midwife, when she was delivered of a healthy child nearly two weeks

previously, which may account for the fact that the existence of the fœtus within abdomen was not suspected at that time.

The second day after that examination the woman dropped dead whilst preparing supper, without any premonitory symptoms. Post mortem examination revealed a full-sized fœtus in the abdomen, but nothing was found to account for the sudden death of the woman.

Dr. Steedman reports a case of some interest. An opening in the soft palate, nearly as large as a silver quarter of a dollar, of a syphilitic origin, was closed by an operation. The first operation failed, the sutures coming away in *three days*. In the second operation, twelve days after the first, the palato-glossi and palato-pharynge muscles were cut across, the mucous membrane dissected up anteriorly to the opening, the pared edges brought together by silver sutures, and a rubber plate fitted so as to cover the palate, but leaving a small space between it and the tissues, which space was filled with cotten saturated with a solution of carbolic acid and glycerine.

This use of a plate over the palate was first suggested, I believe in Boston, a year or two ago, and some experiments with it were made there with success. The opening was longer transversely than in its entero posterior diameter, and extended through the soft palate only.

The last operation was a complete success, the sutures coming away on the sixth day. Operations for the closure of cleft palate, when caused by syphilis, have not often been successful, but if only a portion of the soft palate is destroyed the chances for success are undoubtedly much better than when the bony portion has been involved.

Dr. Pitts gives an account of an epidemic of a malignant type of cerebro-spinal meningitis, which has been prevailing for some time in southern Mississippi, in which male children are entirely exempt. J.

In the "*American Journal of Microscopy*," Hiram A. Cutting, of Vermont, recommends "zinc water mixed with Damar Varnish," for mounting microscopic specimens.

The *Cosmos*, for June, opens with an article by F. W. Clarke, S. B., Professor of Chemistry in the Boston Medical College, upon Anæsthetics.

The claims of Wells, Jackson and Morton, to the discovery of the characteristic properties of anæsthetics is discussed fairly and considerately, contrasting strongly with the bombastic productions of Dr. Bigelow, which were published sometime since in the *Boston Medical and Surgical Journal.* Dr. Clarke gives to Dr. Wells, of Hartford, the honor of first having demonstrated that surgical operations could be performed without pain.

Whilst speaking of the relative value of chloroform, ether and nitrous oxide, he says:

"Ether is the safest, chloroform the quickest, and nitrous oxide, at least for minor operations, the least disagreeable."

That ether is safer than chloroform we are willing to admit, but that it is safer than nitrous oxide has not yet been established, and it is safe to assert that it is not so considered by those who are best qualified to judge. As to chloroform being the quickest in its action we also doubt. We apprehend that nitrous oxide will be found to be the quickest, the pleasantest and the safest of the three for minor operations.

Among the new anæsthetics, chloride of methylene seems to promise best; its action being, according to Richardson, "marvelously rapid, and in all probability safer than chloroform."

Dr. Richardson also speaks highly of the oxide of methyle, and especially with this latter substance, which is a gas, compounded with common ether. The ether readily absorbing one hundred volumes of it.

The transactions of the Southern Dental Association is before us. It is a very creditable production, containing eighty pages, and contains the proceedings at its last April meeting at New Orleans. The discussions were generally well sustained, and the papers read nearly all creditable productions.

The publishing committee have performed their work well, and are entitled to the thanks of the Association. J.

The "*Pacific Medical and Surgical Journal*" is principally filled with the transactions of the Annual Medical Association, which recently met in San Francisco.

The principal questions discussed at that meeting seemed to be those connected with subjects relating to the status to be accorded to female physicians. No determination was reached in regard to the questions sprung upon the Association by certain gentlemen who were particularly interested in having them discussed and disposed of. So we may suppose they will be prominent again before the Association next year. J.

CALIFORNIA STATE DENTAL ASSOCIATION.

The second annual meeting of the California State Dental Association, was held at the rooms of the San Francisco Dental Association, San Francisco, June 6, 7 and 8, 1871.

The Association was called to order at 10:30 A. M., by the President, Dr. C. C. Knowles.

President Knowles delivered his annual address which was received with applause, and that portion of it relative to the education and elevation of the profession, was referred to the Committee on Dental Literature and Education, and the address in full to the Publication Committee.

The several Standing Committees asked for further time to report. Granted.

Doctors Austin, Younger and Dennis were appointed to select subjects for discussion.

An amendment to the By-laws, laid over from last session, creating an auditing committee, was taken up and passed.

Doctors T. Crossett and E. O. Belle, of San Francisco, and A. C. Davenport, of Stockton, were admitted to membership.

The committee appointed for said purpose, reported the following subjects for discussion. Adopted.

1st. Filling Teeth.

2d. Hæmorrhage after Extracting Teeth.

3rd. Treatment of Alveolar Abscess.
4th. The Cause and Treatment of Loose Teeth.
5th. Treatment of Exposed Pulp.
6th. Mechanical Dentistry.
7th. Dental Pathology.
Adjourned to 1:30 P. M.

AFTERNOON SESSION.

Called to order at 1:30, P. M., President Knowles in the chair.

Minutes of the morning session read and approved.

The subject of "Filling Teeth" was taken up and thoroughly discussed by nearly every member present, the discussion lasting nearly three hours.

(ED. — A synopsis even of the discussion would be too long for your purpose. — *Pub. Committee.*)

Dr. C. Hamilton, of Unionville, Nevada, was admitted to membership.

Adjourned to 8 P. M.

EVENING SESSION.

Called to order at 8 P. M., President Knowles in the chair.

An application was received from a gentleman claiming to be a member of the profession, and after being duly examined, permission was given the applicant to withdraw said application. The members, however, were unanimous in the opinion and determination to admit none to membership, but those who could come well recommended as to professional honor, good moral character, etc., etc., as it is desirous to make our Association equal to any in the United States, as far as the honor, professional and otherwise, of its members are concerned.

Subject of "Filling Teeth" again discussed.

Dr. Austin read an Essay on the "Pathology and Treatment of Alveolar Abcess," which was of much interest to those present, and contained very much that was endorsed by the Association.

Adjourned to 10 A. M., to-morrow.

SECOND DAY — MORNING SESSION.

Met at 10 A. M., President Knowles in the chair.

Roll called, and minutes of last session read and approved.

Dr. Sichel exhibited specimens of Hyatt & Perkins' patent base for artificial dentines.

Dr. F. M. Shields, of Sacramento, and Dr. L. G. Yates, of Centreville, were admitted to membership.

Dr. S. W. Dennis read an Essay on the "Causes of the Degeneracy of the Teeth, especially among Children," by S. P. Cutlar, M. D., D. D. S., of New Orleans, La.

The Association tendered Dr. Cutlar a vote of thanks for his kindness in furnishing the very able paper, and made him an honorary member.

The subject matter of Dr. Cutlar's essay was discussed at length.

Adjourned to 2 P. M.

AFTERNOON SESSION.

Called to order at 2 P. M., by President Knowles.

Roll called and minutes of morning session read and approved.

Doctors Younger, Dutch and Crossett were appointed a committee to draft resolutions appropriate to the memory of Doctors F. A. Park, and H. J. Paine, deceased since our last annual session.

The subject of "Hæmorrhage after extracting teeth," taken up and thoroughly discussed.

Dr. Sichel favored mechanical pressure to suppress hæmorrhage, where possible.

Dr. Bush related a case where profuse hæmorrhage followed the extracting of a deciduous superior molar. Failing to arrest it with the usual remedies, finally succeeded with *ice*, applying direct to the socket and surrounding gums.

Treatment of "Alveolar Abscess" was next discussed.

Dr. Younger claimed that not five per cent. of cases treated by him were unsuccessful.

His favorite remedy was saturated solution of iodine, to be pumped into the sacs, and contiuued until cure is affected.

EVENING SESSION.

Met at 8 P. M., President Knowles in the chair.

Officers all present except Dr. Ball, Librarian.

Minutes of the afternoon session read and approved.

Drs. J. A. Woodward, of San Francisco, and N. Klein, of San Jose, were admitted to membership.

Hour of special order having arrived, proceeded to the election of officers, with the following result:

President—Dr. S. W. Dennis, of San Francisco.
Vice Presidents—Dr. H. H. Pierson, of Sacramento.
" " —Dr. J. J. Menefee, of San Jose.
" " —Dr. T. Crossett, of San Francisco.
Cor. Secretary—Dr. H. E. Knox, of San Francisco.
Rec. Secretary—Dr. H. J. Plomteaux, of Woodland.
Ass't Rec. Sec.—Dr. J. W. Myers, of Stockton.
Treasurer—Dr. C. C. Knowles, of San Francisco.
Librarian—Dr. A. C. Davenport, of Stockton.

Dr. Knowles retired from the chair and in appropriate remarks introduced the President elect, who with the other officers assumed their respective stations, and at once entered upon the discharge of their duties.

Doctors J. J. Birge, Wm. Dutch, H. H. Pierson, S. W. Dennis, and W. W. Light were elected Delegates to the National Dental Association.

Adjourned to 10 A. M., to-morrow.

[After the election the Association went in a body to partake of the bountiful supply of the luxuries of life, prepared under the auspices of the San Francisco Dental Association, when the sentiment seemed general that the meeting was a success.]

THIRD DAY—MORNING SESSION.

Association met at 10 A. M., and was called to order by the President, Dr. S. W. Dennis.

Roll called, officers all present.

Minutes of last session read and approved.

Committee on Mechanical Dentistry reported that they had received no information as to the merits or demerits of the Rose Pearl base presented by Dr. Smith, at our last annual session, consequently had nothing further to report concerning it.

Dr. S. W. Dennis, in behalf of the committee on Dental Literature and Education, made a very interesting report. Referred to Publication Committee.

Several resolutions of amendments to the Constitution, were read and laid over under the rule, until next annual session.

Dr. Belle offered a series of resolutions, relative to Certificates of Membership, which was referred to Drs. Knowles, Birge and Menefee.

Dr. Knox offered the following, which was adopted:

Resolved, That our delegates to the American Dental Association be, and they are hereby instructed to use all their influence, that the session of 1872, of said Association be held in San Francisco.

Notice was given that previous to the commencement of the afternoon session, Dr. Knox would illustrate the use of the "Rubber Dam."

The President was authorized to fill any vacancy that may occur from death, during the coming year, in any of the standing committees, by appointment through the Recording Secretary.

Adjourned to 1:30, P. M.

THIRD DAY — AFTERNOON SESSION.

Called to order at 2:30, P. M., President Dennis in the chair.

Minutes of morning session read and approved.

The following preamble and resolutions were unanimously adopted:

Whereas, It has pleased Almighty God, in his infinite wisdom, to remove from our midst our late brothers, Drs. F. A. Park, and H. J. Paine; therefore,

Resolved, That in the death of brothers Park and Paine, the dental profession has been deprived of two of its most active, efficient and honorable members; and the community, of just and upright citizens.

Resolved, That we, the members of the California State Dental Association, deplore the grievous loss which their families have sustained, and cordially sympathize with them in their great bereavement.

Resolved, That the Corresponding Secretary be instructed to forward a copy of these resolutions to Mrs. F. A. Park, and Mrs. H. J. Paine, and that a copy be spread upon the minutes of this Association.

DR. W. J. YOUNGER,
DR. WILLIAM DUTCH, } Com.
DR. T. CROSSETT.

The committee to whom was referred that part of ex-President Knowles's annual address, relative to "Dental Education," etc., reported a series of resolutions heartily approving his suggestions, and recommended "that stringent rules should be adopted to prevent the admission of members to our Society who have not a well established reputation for scientific attainments."

Also, recommending that members do not fellowship, professionally, with those not possessing the above qualifications, etc. Report accepted.

Committee on Publication reported estimates of cost of publishing monthly periodicals, size of the "*Dental Office and Laboratory*," and of "*Missouri Dental Journal.*"

Dr. Knowles offered the following:

Resolved, That it is expedient that a dental periodical be published under the supervision of this Association.

Referred to Committee on Publication with instructions to ascertain the facts relative to aid from the members, probable number of advertisements to be secured, etc.

Dr. Dennis read a letter from Dr. E. A. Boyne, soliciting aid to prepare a suitable testimonial for Dr. S. C. Barnum, inventor of the rubber dam.

Dr. Dennis made a pressing appeal in behalf of said inventor, and the matter was referred to a committee consisting of Doctors Knowles, Younger and Dutch, to take into consideration the propriety of making some substantial recognition to Dr. Barnum for his valuable invention, and our delegates to the Ameri-

can Dental Association, were instructed to use their influence for some general plan, whereby a suitable National Testimonial can be securred for Dr. Barnum.

The President appointed the Standing Committees for the ensuing year, as follows:

Committee of Arrangements—Drs. Birge, Davenport, Shields Yates and Dutch.

On Publication—Drs. Dennis, Plomteaux, (ex-officio) Knowles. Younger and Bunnell.

On Scientific Investigation—1st Section, Operative Dentistry—Drs. Dutch, Menefee and Pierson.

2d Section, Dental Chemistry—Drs. Light, Sichel and Belle.

On Dental Pathology and Surgery—Drs. Austin, Crossett, Prather, Kingsbury and Klein.

On Mechanical Dentistry—Drs. Woodward, Bush, Myers, Cool and Hamilton.

On Dental Literature and Education—Drs. Knox, Younger, Crossett, Eaton and Knowles.

Auditing Committee—Drs. Menefee, Light and Myers.

San Francisco was chosen as the place for next annual session.

On recommendation of Dr. Dennis, Professors J. H. McQuillen, Homer Judd, and J. Taft, were declared honorary members.

The President assigned subjects for Theses, to be read at next annual session, as follows:

Dental Therapeutics—Dr. Knox.

On the Cause of Degeneracy of the Teeth—Dr. Birge.

On the Causes of Irregularity of the Teeth, and best method of correcting the same—Dr. Knowles.

On the Pathology and Treatment of Alveolar Abscess—Dr. Menefee.

On Dentistry, its history, present status, claims and relations—Dr. Plomteaux.

On Professional Ethics—Dr. Bunnell.

On the Causes and Treatment of Loose Teeth—Dr. Younger.

On motion, adjourned to meet in San Francisco, second Tuesday in June, 1872, at 10 A. M.

DR. H. J. PLOMTEAUX, Rec. Sec'y.

17th ANNUAL AMERICAN DENTAL CONVENTION.

Messrs. Editors:

Permit one of the *original members* of the American Dental Convention to call the attention (through the medium of your Journal) of the profession, to the fact of its continued existence, and of the celebration of its Seventeenth birth-day at Saratoga, on Wednesday the 9th day of August, 1871.

The attention of the profession for a few years past has been somewhat diverted from this organization, but they now are disposed to return to their first love, and the hope is entertained that at the next meeting its old and new friends will present themselves in numbers far exceeding that of any former meeting.

All practicing dentists in good standing are entitled to the privileges of the Convention.

Official notice of the meeting will be given in the next number of this Journal.

A. D. C.

AMERICAN DENTAL CONVENTION.

The undersigned Committee of Arrangements would inform the dental profession, that they have made arrangements for holding the Seventeenth Annual Meeting of the American Dental Convention, at Saratoga Springs, commencing on Wednesday the 9th day of August, at 11, A. M.

Should the attendance be as large as anticipated, a liberal deduction will be made to members of the Convention, by the proprietors of two of the principal hotels, with the assurance that no effort will be spared to make their guests as comfortable as possible.

Arrangements will be made for the display and exhibition of

Dental Materials and Appliances of all kinds. Also for clinical operations during the entire session.

Dentists and others desirous of exhibiting instruments, materials or improvements in any department of dentistry, are particularly invited to present them as early in the session as possible, and to notify the committee of their intention to do so.

As August is a very busy month with hotel keepers, it will be advisable for those intending to be present to notify the committee of their wishes, etc., at 25 West 23d street, N. Y.

Efforts are making to secure a reduction of fare by Rail and steamboat.

I. G. AMBLER,
I. S. LATTEMER,
W. B. HURD,
I. S. SMITH,
} Committee of Arrangements.

AMERICAN DENTAL ASSOCIATION.

The eleventh annual meeting of the American Dental Association, will be held at White Sulphur Springs, Virginia, on Tuesday, the 1st day of August next.

The following facts are condensed from a pamphlet by Dr. Moorman, a resident of that place:

White Sulphur Springs are situated in Greenbrier county on the western slope of the great Apalachian chain of mountains, latitude 37½° north, longitude 3½° west of Washington. Thermometer ranges in summer, between 55° and 65°, and rarely attains a greater height than 80° at any time in the day. "The situation of the springs is elevated and beautifully picturesque, surrounded by mountains on every side."

These Springs are at the present terminus of the Chesapeake and Ohio Railroad. The traveller by rail to White Sulphur, *from any quarter of the country*, must pass through the town of Staunton.

Persons from the East, North or West make Baltimore and

Washington points in their route to the Springs. At Washington they take the Orange and Alexandria road to Gordonsville; then the Chesapeake and Ohio to White Sulphur via Staunton.

Those from the South have a continuous line of railroad, either by way of Richmond, Va., or Knoxville, Tenn.

Persons going by the Knoxville route will take the Virginia and Tennessee Railroad to Lynchburg: then the Orange and Alexandria to Charlottesville, then the Chesapeake and Ohio to Staunton and the Springs.

Those taking the Knoxville route will find a daily line of stages at the "Montgomery White," that run to White Sulphur, a distance of sixty-five miles.

Accommodations seem to be ample; the Hotel building covering more than acre of ground. The dining room conveniently seating one thousand two hundred persons.

M. S. Dean, Sec'y.

The following information has been received from the various members of the Committee to secure reduced rates of fare to White Sulphur Springs and return, for members of the American Dental Association:

New Orleans—all roads leading from this city, half fare.

Louisville—half fare.

Cincinnati—half fare.

St. Louis—

Chicago—No arrangement has yet been perfected—should any be made, due notice will be given through the daily and weekly press.

Philadelphia—not heard from.

New York—fare for the round trip $21.60. Tickets to be obtained at 111 Liberty street, New York City.

Boston—All members from this city and New England have to go via New York. Tickets to be obtained at 82 Washington street, Boston.

San Francisco—half fare has been promised from Omaha to Chicago, and it is expected the same will be granted throughout the entire line.

Members who cannot avail themselves of through tickets from any of the above central points, or who can only secure reduced rates as far as Washington or Baltimore, will find tickets for the round trip from Washington to White Sulphur Springs and return, at 603 Pennsylvania Avenue, Washington. Fare $12.50.

The Committee cannot forbear noticing the promptitude and generosity with which their appeal was met by the agents of the Orange, Alexandria and Manassas, and the Chesapeake and Ohio Railroads. It is in very plain contrast with the hesitancy and objections made by some of the other roads.

GEO. H. CUSHING,
Chairman of Committee.

ILLINOIS STATE DENTAL SOCIETY.

The seventh annual session of the Illinois State Dental Society was held at Peoria, commencing on Tuesday, May 9, 10 A. M. Dr. G. V. Black, of Jacksonville, President; Dr. C. Stoddard Smith, of Springfield, Secretary. The meeting was large and enthusiastic, and the work done at this session for the promotion of Dental Science and the elevation of its members, is an evidence of the activity and energy which characterizes this Society as one of the best in the land.

This is the fifth of these annual gatherings of our professional brothers of Illinois that we have attended, and we hope to be present at the next meeting; we feel that we cannot afford to be absent. It is a refreshing treat, mentally, professionally and physically.

The labors of this Society for the elevation of the standard of the profession, are not confined alone to the time spent in convention. At the session of 1870 a committee was appointed to memorialize the legislature for the passage of a law to regulate the practice of dentistry in the State. The committee reported at this session that they had not been idle; a petition and bill

had been introduced into the legislature, but on account of the pressure of other important business it failed to become a law. The committee was continued and the prospect is that before another meeting, the claims of the profession will be recognized by the passage of a law that will drive quack and itinerant tooth-carpenters from the State of Illinois. God speed the good work.

The Society has also shown commendable zeal in having its transactions published in book form, making a volume of 112 pages, the size of our journals. 750 copies of the session of 1870 were published and distributed among the profession in the State, at a cost of $200. The transactions of 1871 are to be published in the same style.

The hospitalities of the city were tendered the Society in a pretty speech of welcome by the City Attorney, Mr. Quinn, in behalf of the mayor and citizens of Peoria.

The following essays, on subjects selected at the previous session, were read at this meeting, and discussed by most of the members present:

"Dental Caries," E. C. Koch; "Keeping Cavities Dry," K. B. Davis; "Essential Principles of Filling Teeth," R. C. Mowbray; "Smooth Point Pluggers and Gutta Percha Faced Mallet," G. A. Howard; "Relative Duties of Dentists and Patients," J. N. Crouse; "Abnormal Secretion," O. Wilson; "Dental Pathology," G. H. Cushing; "Stomatitis Materna," I. P. Wilson, Burlington, Iowa; "Dental Ethics," M. S. Dean; "Alveolar Abscess — Its Cause and Treatment," C. S. Smith; "Diseases of Antrum," E. H. Kilburn.

Our space will not permit a review of the papers, or a report of the discussion. We can only say the papers were all good, gave evidence of much study and thought, and the discussions would do credit to any Society.

To those of our readers who desire to keep posted in the profession, we say get a copy of the transactions and read it; the knowledge gained thereby will amply repay the cost.

EAMES.

IOWA STATE DENTAL SOCIETY.

OFFICE CORRESPONDING SECRETARY I. S. D. S.,
MUSCATINE, IOWA, May 21, 1871.

DEAR DOCTOR—

The 9th annual meeting of the Iowa State Dental Society takes place in connection with the annual meeting of the Missouri Valley Dental Society, at Council Bluffs, Iowa, beginning July 11th, at 7 o'clock, P. M., and will continue in session, at least, two full days.

It is most earnestly hoped that every Dentist in this State and in the "Missouri Valley," who wishes to be counted "up to the times" in his profession will be present at this meeting. There are many new things in our profession to be seen and talked over, and this is the place to do it. Come prepared to take part in the proceedings of the meeting. Volunteer Essays upon any subject in the profession are called for. Our State Society is the voice of the dental profession in Iowa. As it stands so does the dental profession in our State, so far as influence abroad is concerned. Let nothing, therefore, detain you from attending this meeting. The subject of a law regulating the practice of dentistry in Iowa will be acted upon at this meeting.

Arrangements have been made with the three great railroads running across our State, and centering in Council Bluffs, to carry members of the profession at three-fifths regular fare for the round trip. The Chicago and North-Western Railroad Company issue one-fifth return tickets, to those presenting certificates of attendance.

The Chicago, Burlington and Missouri River Railroad, will sell three-fifths round trip tickets from any station upon their road.

The Chicago, Rock Island and Pacific Railroad issues orders for excursion tickets, and upon presenting them at any station upon their road, round trip tickets will be sold for three-fifths their usual fare. These orders I will furnish to any applying to me before July 8th.

Arrangements have been made for reduced hotel accommodations, during our stay at the bluffs. There will be a large stock of teeth and other dental goods, to give us further inducements to come.

Arrangements have been made to have present some of the new machines that have lately come out, and promise so much.

Prominent members of the profession from other States are expected to be present. Everything has been done to enable us to have a good and profitable time. We will have it if you do your part.

Fraternally yours,

I. P. Wilson, Pres't.

W. O. Kulp, Corresponding Secretary.

ESSAYISTS AND SUBJECTS.

Dr. Rathburn, of Lyons: "Cleaning Teeth." Dr. Sanborn, of Tabor: "Oxygen, Its Relationship to Vital Phenomena." Dr. Wilson, of Burlington: "Anæsthetics in Dentistry." Dr. H. H. Ray, of Bellevue: "Cell Life." Dr. Hardman, of Muscatine: "Twenty years ago and now." Dr. Smith, of Iowa City: "Dental Hygiene." Dr. Ed. Chase, of Iowa City: "Dental Chemistry." Dr. Magill, of Rock Island, Ills.: "Absorption of the Alveoli and Treatment." Dr. H. W. Ray, of Bellevue: "Cell Formation." Dr. Taylor, of Fort Madison: "Dental Surgery."

SUBJECTS FOR DISCUSSION.

"Making and Tempering Instruments:" Discussion to be opened by Essay or otherwise, by Dr. Derr, of Grinnell, Iowa. "Dental Education:" By Dr. Ingersoll, Keokuk. "New Basis for Artificial Teeth:" By Dr. J. S. Kulp, of Muscatine. "Filling Teeth:" By Dr. Thomas, of Nebraska. "Professional Dignity:" By Dr. I. B. Woodbury, of Council Bluffs. "New Things in Dentistry:" By Prof. H. S. Chase, of St. Louis, Mo. "Dental Legislation:" By Dr. W. O. Kulp, of Muscatine, and Dr. A. B. Mason, of Waterloo.

NORTHERN IOWA DENTAL ASSOCIATION.

The Annual Meeting of the Northern Iowa Dental Association for the year 1871, has just closed, having been in session since Tuesday evening. Though the attendence was not as large as was desirable, great interest was manifested and all left feeling amply paid for attendance on its sessions. Six sessions were held—one on Tuesday evening, three Wednesday, and two Thursday. The first session was, as the usual one at such meetings, organizing for business, appointment of committees, etc.

There were several in attendance who were not regular members of the association. The members present at this meeting were:

President—J. T. Abbott, Manchester.

Treasurer—C. Poor, Dubuque.

Corresponding Secretary—M. D. Goble, Dubuque.

Recording Secretary—A. V. Eaton, Anamosa.

W. P. Dickinson, Dubuque; John Nicholson, Tama City; E. Ebi, Cedar Rapids; C. P. Artman, Waterloo.

At the morning session on Wednesday, the committee on membership recommended the admission of G. North, of Springville, for full membership, and B. B. Maydwell, of Manchester, and W. H. Walker, of West Branch, for junior membership—the two latter not being eligible to full membership as per section 2, article 3, of the constitution. They were so elected.

Dr. Goble having been appointed to read an essay on "Heavy Foils and Materials for Filling Teeth," took up considerable time in the description of "heavy foil," how made and the manner of using, etc. In the same connection he spoke of mallets, dwelling particularly on wood, lead, and the gutta-percha faced lead mallet, giving precedence to the latter, the weight to be six ounces. The balance of the session was taken up in the general discussion of the subject, which was participated in by most of the members present.

At the afternoon session Dr. Poor, of Dubuque, explained his

newly invented burring machine, and gave a practical demonstration of its use, in the preparation of cavities for filling, for several of the members.

The president, Dr. Abbott, read an essay on the subject of "Dental Etiquette," presenting the subject in such a light that none failed to see the necessity for adopting a higher standard than that maintained by certainly a majority of dentists in the West.

Dr. Artman then read an able and instructive essay on the subject of "Alveolar Abscess," among the notable features of which was the application of ether or rhigolene spray, in the first stage of the disease. This was followed by the presentation of several interesting cases, and the subject had a fair discussion.

The election of officers for the ensuing year being next in order, it was had with the following result:

President—Dr. J. T. Abbott.

Vice President—W. P. Dickinson.

Corresponding Secretary—C. P. Artman.

Recording Secretary—A. V. Eaton.

Treasurer—C. Poor.

The discussion of the subject of "capping nerves" was opened by Dr. Nicholson, followed by most of the Association. Oxy. chlo. zinc, the article most used; perhaps the most noticeable feature presented was the application of a covering of equal parts by weight, of collodion and sulphate of morphia, before filling or capping with the oxy. chlo.

An essay on "Fees and Fee Bills," was then read by Dr. Eaton.

At the morning session on Tuesday, Manchester was the place selected for the next annual meeting.

The president appointed the following standing committees:

Executive Committee: M. D. Goble, C. P. Artman, and E. Ebi.

Committee on Membership: J. Nicholson, C. Poor and A. S. Hodge.

Committee on Ethics: The last year's committee continued.

Dr. W. P. Dickinson then gave the association the benefit of some notes and remarks under the head of "Little Things,"

neatness in and about the office, courtesy to all patients, and to neighboring dentists. Application of rubber dam, and preparation for its application where cervical cavities are to be filled, and the thorough following up of fissures in the crowns of the molars and bi-cuspids being among the points touched upon. A diagram to illustrate the last point was prepared and the importance of the subject was clearly set forth. The Clinic being the next in order, Dr. Dickinson proceeded to fill a large crown cavity with gold for one of the members; in its preparation quite an extended fissure on the buccal surface was cut out in demonstration of the views he previously advanced. Dr. Goble rendered valuable assistance in the application of the rubber dam, and in malleting for the filling. Dr. Poor's burring machine was brought into requisition for finishing, and gave universal satisfaction.

At the afternoon session the meeting was adjourned to meet at Manchester, as above stated.

Throughout the entire meeting the utmost harmony prevailed, the only regret being the absence of a number of the regular members, and quite a number who had signified their intention to be in attendance. It is surprising that when such opportunities for gaining information are presented, that any one can be induced to stay away, no one certainly who has any desire to progress can afford to.

C. P. Artman, Cor. Sec'y.

OBITUARY.

Dr. J. G. Willis, of Cincinnati, a prominent practitioner of that city, died suddenly, a few days since, having been in perfect health up to within a few moments of his death. It is probable that his death was the result of organic disease of the heart.

Dr. Willis had located in Cincinnati only two or three years since and had already established himself in a lucrative practice. Only during the last few years had he mingled with his

professional brethren in Associations and Conventions, but he had already gained a reputation as a ready debator, and gave promise of becoming one of the most prominent men in the profession.

He was well fitted both by nature and education to fill a high place among those whose names shall live long after their bodies shall have crumbled into dust. We have known Dr. Willis for more than twenty years, and when the sad news of his death fell like a thunderbolt upon us, we felt that the profession at large had sustained a loss that but few would ever fully appreciate. It is true that he had but lately entered the arena, and was comparatively but little known; but a few years more, we are satisfied, would have given him a standing second to none among the honored names in the profession.

The following resolutions, adopted by the dentists of Cincinnati, we find in the Cincinnati papers:

RESOLUTIONS AS TO DR. WILLIS.

At a meeting of the dentists of the city, held yesterday, at the office of Dr. Berry, the following resolutions were adopted, expressive of the sense of the profession in regard to the death of Dr. J. G. Willis:

"*Resolved*, That in the very sudden and unexpected death of Dr. J. G. Willis, of this city, we regard a marked instance of the inscrutable working of His hand, to whom we are all responsible and subject.

Resolved, That we cannot but lament the loss of a member of our profession of such marked ability, both natural and acquired. Of him much was expected by his profession, and that expectation was always honored. He stood highest in the estimation of those who knew him best.

"*Resolved*, That in his death we, in common with all who knew him, suffer the loss of a valued and useful member of society, one whose kind-hearted geniality, and Christian, gentlemanly bearing could not but be recognized by all.

"*Resolved*, That we tender to the bereaved family our most sincere sympathy, and express to them the great sadness we cannot but share with them.

JAMES LESLIE,
Chairman."

"H. A. SMITH, Secretary.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

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ON FERMENTATION.

By Professor A. W. Williamson, F. R. S. Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 246.)

There is one other remarkable instance which I must give you, to show the difficulty in some cases of analysing these phenomena. It is the case of the metal platinum, which I can hardly describe better in general terms, as regards its properties, than by comparing it to gold. It is what is termed a noble metal; it does not dissolve in any ordinary acid; you might boil platinum in nitric acid for any length of time and it would not dissolve. On the other hand, silver is a metal which dissolves readily in this acid, and if you melt silver and put platinum into it, it will also melt, and you obtain a compound of the two metals mixed pretty uniformly together. It was noticed that when such a button of platinum and silver is put into nitric, not only does the silver itself dissolve, as you would expect, but some of the platinum also dissolves with it; not the whole, but a portion. That seems, at first sight, favorable to the theory of contagion; it seems natural to suppose that the silver, in dissolving, has communicated

the same tendency to the platinum, and made some of it dissolve. But that explanation will not do, and for this reason. When platinum is combined with anything else, I care not what, its properties are not the same as when uncombined. The very essence of chemical combination is that the particles which are in intimate contact unite, and that the compound possesses different properties from the original elements. We know that metals combine with one another; there are many cases known to us of the forcible union of metals, and we have no right to suppose in any case, unless we have actual proof of it, that a metal is present in such a compound with its ordinary properties. Therefore, it is not free platinum, but a compound of platinum and silver which dissolves, and there are some compounds of platinum which dissolve in water, and others which dissolve in nitric acid, so that this process has really nothing to do with contagious action.

In the composition of alcoholic ferments there are several substances of which we know very little at present, I am sorry to say, but the want of this knowledge is so great that I have no doubt it will be soon supplied; certainly, this is a most important field for the investigation of naturalists who possess an accurate knowledge of chemical manipulation. I mean the simplest and lowest organisms, whose functions are of such importance in these changes, and certainly claim much careful investigation. But some of the things which we do know about the yeast-cells, I must now state, with relation to the facts and ideas which we have just had before us. In the first place, with regard to their growth. It is very common, in the process of brewing, to feed the yeast-cells with a substance which is formed in the germination of barley. When barley is left in a moist state, at a suitable temperature it begins to sprout, and during that process there is a change in two of its constituents, which I showed you the other day. One is gluten, a body containing nitrogen, which I compared, for the sake of convenience, to muscular fibre, being in reality very closely allied thereto in chemical composition, and during the germination of the seed this substance passes over into some product or products — I had better speak quite generally

—known by the name of diastase. In the yeast-cells there is a substance very nearly resembling in composition this gluten, and it cannot be doubted that this gluten, or albuminous body as it is frequently called, is capable of undergoing a similar transformation into diastase, and of all foods the yeast-cell enjoys most those which contain diastase. I have a good many yeast-cells growing in a suitably heated chamber, and those which seem to thrive most are some which were put into an infusion of malt to which sugar was added. It is common, in the process of fermentation, to put in yeast in tolerable quantity, but the extent to which it grows depends upon the time for which it is left in contact in the material. I am told that the common proportion is about one-twentieth of the quantity of yeast required. For instance, if 20 lbs. of yeast are wanted to effect a given fermentation, you put into the liquid which has been fermented 1 lb. of yeast calculated in the dry state, and give it this diastase to feed upon. At the same time, there is sugar present in the liquid, and during the process of fermentation this pound weight of yeast increases more and more, by a process of true germination and growth. Professor Mitscherlich actually saw, under the microscope, some little cells of yeast sprout and put out, from the side of the parent cell, small cells, which gradually increased in size. The actual process, however, has not been seen by many observers. And not only does the yeast-cell in that way feed upon these albuminous bodies, which are grouped together by the name of diastase, but it also takes part of the sugar; and these are the two prominent facts which we know with regard to its food—that it feeds upon substances of those two classes; sugar, which contains no nitrogen, and also nitrogenous substances, which are formed by the partial breaking up of the gluten. On the other hand, its decomposition —I mean during its life; I am not speaking of any decomposition which its materials may undergo if it is killed—gives off alcohol, carbonic acid, succinic acid and glycerine; in fact, the four chief products of ordinary alcoholic fermentation, which I enumerated to you the other day. And while these products are being given off, there is at the same time a considerable quantity of nitrogenous substances being given off. The albuminous matter in the

yeast-cells is undergoing decomposition, and is giving off nitrogenous substances. There is not any well-authenticated case of the yeast-cell forming, during its active functions, products of complete breaking up or putrefactive decomposition; all the products which we know best are substances of considerable complexity—less complexity than the materials of the plant, but of great complexity; and, accordingly, the notion which Liebig had that the yeast-cell is active in the proportion as its materials are undergoing complete analyses or breakings up, and forming ammonia and carbonic acid, is not now entertained by that distinguished philosopher.

Some time ago, an exceedingly important experiment was made by M. Pasteur, with a view of testing the vital functions of the yeast-cells in a definite way. The statements which I have made to you contain a good many terms which are exceedingly general, as, for instance, the allusions to diastase. We really do not know what that is. We know about what sort of a thing it is made from, but not definitely. And the same with the nitrogenous products which are given off by the yeast-cells; we know something about them, but only a little. Pasteur put into a solution of sugar, in which some yeast particles were present, some ammonia combined with an acid, and at the same time he put some of the ashes of other yeast-cells. He took a certain quantity of yeast and burnt it, so as to remove by oxidation the carbon, hydrogen and nitrogen of the substance, and the earth substances which remained, which are essential to the formation of a new yeast-cell, he put in some fermenting liquid, together with some salt of ammonia. When he did that, he really was treating the yeast-cells very much in the same way as a good farmer treats the wheat plant. If you want a wheat plant to increase rapidly, you must, in the first place, take care to supply to it all that the wheat plant takes up in the shape of mineral matter from the soil, and the best way to find that out is to burn some wheat, and see what is left. Then you must supply plenty of ammonia, and the more ammonia you supply up to a certain extent, the more rapidly does the wheat grow, by building up various simple substances into the complex substance, gluten, which I was speaking of just

now. Pasteur put into such a mixture a few little cells of the yeast, and they did not thrive. They did transform some sugar into alcohol and carbonic acid, but they evidently were not at home, and at the end of a certain time, I forget how long, he found there was actually a smaller weight of yeast present than he had put in. That was a very different result from what happens when nitrogen is supplied to the yeast-plant in the form which I mentioned just now as the usual one; and I think the fact is most instructive, and serves to show us what kind of a being the yeast-cell really is, — I mean whether it should be classed among animal or vegetable beings. I need hardly say that absolute distinctions amongst beings which we find in nature are out of the question; we do not generally get any absolute line of demarcation, for one class flows over into the other; but still the ideas which serve us to classify organic and other beings are exceedingly important, and in a case like this it is certainly of considerable interest to have some leading idea, by which one may see whether there is a reason for placing these beings amongst vegetable or animal organisms, and we cannot help giving special weight in that respect to the kind of process which the respective classes of beings carry out in their organisms. Plants build up complex substances from simple. All the most complex substances that we can get are made in the organisms of plants. They may have been taken over by animals from plants, but they are formed in the main by plants. And the chief chemical activity of animals is precisely opposite; they take those complex substances, and break down, by means of their vital functions, to the simple products which are exhaled and given off in the processes of animal life. Therefore, the question whether the process which the yeast carries on is a synthetical process, is certainly one of the most important which can guide us. Now, I think what I have said must appear to you all most conclusive in that respect, — that what we know best regarding the nature of the yeast-cells, the food which we know they take in large quantities, and upon which they live, is certainly exceedingly complex, and what the yeast-cells take up in preference is certainly sugar, and the very complex nitrogenous substances which are present in solution in the malt, and the

products which they give off, are exceedingly simple in comparison. Their functions are in the main (those which we know best, at any rate) analogous to those which take place in animal organisms, and are most remote from those which take place in vegetable organisms.

In a paper which he has recently written on the subject of fermentation, Liebig has drawn attention, amongst other things, to the circumstance that the common alcoholic ferment can be made to eat tartaric acid. If you were to neutralize a solution of some of these crystals in water, and put with the solution some yeast-cells, at the same time supplying some nitrogenous material, the yeast-plants would grow, and transform that into other substances. In the same way, if you were to put in some of this malic acid (which got its name from the circumstance that it is present in sour apples), the yeast-cells would also transform that; and the same in other cases. One of the most remarkable decompositions is that of nitric acid, which, by the action of the yeast-cells, is deprived of some of its oxygen, and converted into nitrous acid, so that it would appear that the plant can actually assimilate or eat the nitrates, forming these simpler derivatives from them.

There is one case which I should like to show you, of an inorganic action, one in which there is no vital process concerned, but it bears a sort of general resemblance to what I conceive to be the principle of those which I have been speaking of. I have here a piece of platinum in a peculiar state, which is well described by the term "spongy." If I hold it in the flame of common coal-gas mixed with air, from a Bunsen burner, the spongy platinum eats the air or the oxygen contained in it and the gas. The word "eat" is not really so inappropriate as it may seem. If I were to put this spongy platinum into oxygen, I should find that it would combine a quantity of oxygen into its substance, and make it part of itself, and the same with regard to the coal-gas. So that here you see, from the heat which was given off, the substance is really effecting a chemical change upon the materials which it absorbs, and it effects that change in its own substance. It is admitted that, in some way or other, the yeast

organisms — I will not again call them plants — actually assimilate and make part of themselves the sugar, or tartaric acid, or whatever it may be which they decompose; but they do not give off that substance which they have eaten in the same form. They give off its elements, after they have undergone a rearrangement in other ways. At our next meeting I propose to bring before you some different considerations regarding the vital functions of these organisms, and some points which bear upon questions of sanitary importance.

(*To be continued.*)

TEMPORARY TEETH.

By Chas. R. E. Koch. Read before the Chicago Dental Society.

There is, perhaps, no subject in relation to the teeth, upon which the public is less informed than that which we are to consider this evening. Even from among the most enlightened of our patients upon other matters, we occasionally hear the remark, "I did not know it was of any importance to preserve the *baby* teeth, won't others come in their places?"

Possibly we are in a large degree responsible for this almost criminal ignorance; and we certainly mistake our calling, and are remiss in our duty, if we do not improve every opportunity to enlighten and educate the public mind upon this subject. We should always impress upon mothers and those having the care of children, the necessity of taking care of the deciduous teeth; and we certainly will find a higher reward in the contemplation of the results of such few words of instruction and admonition, than we could possibly realize in any other way.

While general rules may be of some service as a guide in practice, these can seldom be closely adhered to in any given case, as special conditions or contingencies may demand a marked deviation in treatment of apparently similar cases.

To be able to treat deciduous teeth scientifically requires by far more circumspection and reflection than would a similar condition in the permanent organs. We will, in nearly all cases, have to exercise our individual judgments based upon physiological and pathological laws, and the anatomical relations of the deciduous teeth to their successors, before we can make a conscientious diagnosis, or prognosis.

An All-wise Providence has given to children a set of teeth, which the study of physiology has convinced us, are given not merely as an ornament, but for a functional purpose. These are to last for a certain time, when they are to be replaced by such others as will more readily perform the increased requirements of an increased organism. This fact ought to convince us that our efforts should be in the direction of preservation.

To this end all the remedies generally employed as preventives of caries should be recommended. Chief of these are cleanliness—of the body as well as the oral cavity—pure air and properly nutritious food.

Should caries occur in the deciduous teeth at an early age, and be allowed to progress, it would probably cause serious inflammatory disease in the surrounding tissues, and premature loss of these teeth. Hence, such carious cavities ought to be filled as early as possible with some suitable material, with a view of preserving them during their supposed time of usefulness. The molars and cuspids being thus affected, before say the ninth year, should especially be treated in this manner. As these are generally succeeded by others in from the tenth to twelfth year, it is hardly necessary to attempt preserving them through this means, should caries set in after the times first mentioned, unless we have some good cause for suspecting a retarded, or numerically deficient, second dentition. Should we know that either of the child's parents suffered from a retarded second dentition or a deficiency in number of the permanent teeth we would have good cause for attempting to save the deciduous teeth beyond their usual time of shedding.

Unless the incisors are attacked by caries at a very early age, say the third or fourth year, it is hardly necessary to interfere

with them, as caries can be more readily retarded in these teeth by especial care. If it be deemed advisable to interfere with caries in the teeth by an operation, it may often be found that cutting away the diseased portion by means of proper instruments, and leaving a polished surface, will most effectually prevent further progress of the disease, and preserve the teeth during their natural lifetime. The fact that these teeth are usually succeeded by the teeth of replacement, in from the sixth to eighth year, must not be forgotten. The process of calcification in the permanent teeth of this class commencing quite early, there is less danger of injury being caused to their germs from lesions upon their deciduous predecessors, than in the case of those teeth having a later period of eruption.

Should periostitis occur in the deciduous teeth, the treatment ought to be the same as in the case of the permanent teeth.

If the pulp has become exposed in teeth which it is essential to preserve for a while longer, a filling of oxychloride of zinc should be introduced in the carious cavity, having previously treated this as we should have done in the permanent teeth. If we do not succeed in keeping the zinc filling dry sufficiently long to insure its hardening, we can remove all but a cap of it over the exposure and fill over this with Hill's stopping, gutta percha, or if you please, amalgam, well washed and pressed. I must declare my preference for the first named substance.

It has been for a long time a matter of doubt in my own mind, whether the heroic practice of using arsenious acid in deciduous teeth, for the purpose of devitalizing their pulps, is judicious or not. Since the almost uniform success with oxychloride of zinc there is hardly any excuse for incurring the risk which almost in all such cases must accompany the use of arsenic. No matter how astute our observations may be we cannot tell to what extent absorption of the roots has progressed, and hence we can not tell how far the action of the arsenic may penetrate, even with as much certainty as in the case of the permanent teeth; and you will no doubt bear me out in the assertion that even in these teeth this *certainty* is *doubtful*. We have often to extract deciduous molars with divergent roots, which remain quite firmly fixed

and which would have led us to suppose that absorption had not progressed far; yet, upon removing these teeth, we find that the dentinal substance next to the base of the pulp is entirely gone, and the pulp in contact with the plexus of absorbents. Can we tell how much of the tender tissues, besides the pulp would be destroyed by an arsenious application in such a case?

The permanent tooth may have advanced so far in its process of calcification as to escape injury, but its alveolus certainly would suffer. Necrosis and exfoliation of this latter might ensue; and may not the sequestrum, in trying to make its exit, exercise sufficient force to misdirect the advancing permanent tooth, so as to cause malposition of this in the dental arch?

A lady patient, while absent from the city, suffered with severe pain in an upper left cuspid tooth, which had been previously treated for alveolar abscess through an opening to the dental canal, made from the anterior cervical surface of the tooth.

The dentist upon whom she called, evidently did not understand the case, and made an application to *destroy the nerve* through this opening, which of course did not afford her any relief. She returned about a week after, and I then found the labial side of the gum in a very much inflamed condition, and observed spiculæ of the alveolar process quite loose, protruding between the affected tooth and its anterior and posterior neighbors. These were removed, and the tooth treated with sedatives and stimulants until the pain had entirely ceased, and its surrounding tissues presented the appearance of health. The patient was not seen again for over three years, until very recently when I found that the labial plate of the alveolar socket was entirely gone, as also the soft tissues over it. The root is entirely denuded of its covering, and is a black unsightly looking mass. The tooth is still quite firmly fastened, but seems to have made an advance anteriorly, being now more prominent then its mate. This is probably caused by new deposits of bone upon the inside of the platal plate of the socket. This case does not properly belong here, unless it may aid us to judge by analogy.

After the exhibition of arsenic in a deciduous tooth, injury to the alveolus may not be so permanent, as the growth of the alve-

olus of the permanent teeth is contemporaneous with their eruption, and is not entirely completed until some time after these teeth have assumed their permanent position; still, as we cannot tell just in what manner, and to what extent this drug may act injuriously, we had much better abstain from its use altogether.

Whether the premature loss of the deciduous teeth predisposes irregularity in the permanent teeth or not, seems still to be a mooted question. Mr. Tomes thinks there is more harm done by extracting too late than too early, as the now absorbed deciduous roots may so much resist the advance of the permanent teeth as to cause them to take position posterior or anterior to their deciduous predecessors. Prof. Harris thinks much harm is done by premature extraction, and a consequential bony contraction, and is diametrically opposed to Tomes. Before concluding which view to adopt, let us examine into observed physiological facts. Nearly all writers agree that the space occupied in the jaw anteriorly, by the ten teeth of the deciduous set, and the anterior ten teeth of the permanent set, is very nearly equal.

I have had imported from the publishers at Leipzig, a recent German work on the Pathology of the Teeth, by Prof. Weld, of Vienna, a notice of which I have seen in the "Cosmos" for February, of the current volume. The first seventy pages of this work are devoted to physiology and anatomy. Glancing over this, I noticed a series of measurements in regard to the growth of the jaw, which I deemed of interest enough to translate. with your permission, I will interline this translation here.

"Hunter was the first to take the position that the maxillary portions occupied by the deciduous teeth, do not grow after the completion of the first dentition. Fox agreed with him in all essentials. They arrived at this result by means of measurements of macerated lower jaws. Delabarre, upon the contrary, has tried to establish the longitudinal growth of the bone after first dentition, by clinical observations; he maintains that the deciduous teeth separate from one another at the age of five or six years, and says that individuals with whom this does not occur, are threatened with an irregular second dentition. Fox recognized

this appearance before Delabarre, yet did not attach to it the same signification, as he believes that the anterior portion of the maxilla undergoes scarcely more than a change of form, which is in conformity to the shapes of the permanent teeth and does hardly add to its size. Thos. Bell remarks emphatically that we must not rely upon comparsions of jaws of different individuals. The only way to arrive at the truth in the matter is to examine the same jaw at different stages and to compare the results. This, says Bell, I have repeatedly done, and am not at all backward to say, that the ten anterior permanent teeth form a somewhat larger arch than the temporary teeth which preceded them. Chapin Harris joins in the belief of Bell, and thinks that the transverse and perpendicular dimensions of the anterior portion of the jaw, continue to grow until the completion of second dentition and even up to adolescence. Tomes inclines to the opinion of Hunter, and expresses himself as opposed to an interstitial bone growth.

According to Hunter, the growth of the arch of the lower jaw in its perpendicular dimensions, is owing to periosteal and in its transverse dimensions to expansive bone growth. He is of the opinion, that there does not occur any more essential growth in the arch of the lower jaw, between the first molars, after birth. Welcker's measurements are said to agree with this. Generally Hunter expresses himself as opposed to an interstitial growth of bone. Rich. Volkman expressed himself in favor of this some time ago, and again recently. C. Ruge and Julius Wolff have also declared themselves in its favor. I join these for reasons which will become obvious in the perusal of this work.

There can be no doubt that, as already stated, the expansion of the arch of the jaw is produced by the formation of new bone substance upon its facial wall, and resorption upon the lingual wall. By this process the front teeth are shoved in an anterior, and the posterior teeth in an external (buccal), direction.

This locomotion of the teeth is, however, only to be thought of, if, in the interior of the bone, resorption also takes place, as otherwise the teeth, being covered by new layers upon the facial wall of the jaw, finally would be nearer the lingual wall, which is not the case.

Hence there must be an interstitial resorption. Fox advocates a change of form of the jaw during growth, yet this is, as mentioned by him, only true in the case of the upper jaw. He says: if we compare the jaw of a child with that of an adult, we will remark a very apparent difference; that of a child forms nearly half of a circle, that of an adult half of an ellipse. This metamorphosis of the jaw we will investigate closer further on.

To establish the proportions of the growth of the lower jaw we must first search for the least variable point from which to commence our measurements. As a matter of course we can not attain to absolute exactness, and the truth can only be approximately arrived at. The unavoidable errors in observation are weightiest when the distances to be measured are smallest. The longitudinal dimensions offer fewer difficulties in their establishment than do those of height and thickness.

I have instituted a series of measurements upon forty-five skulls of children in regard to the growth of the lower jaw lengthwise, and also partially with a view to become acquainted with the individual differences: and have used for this purpose a thin, somewhat moistened, strip of paper closely applied;—and with this I have measured the peripheral limits. Measurements made upon a crooked object by means of a pair of dividers, give, as a matter of course, their sector, and this latter remains the same under variable crooks. As a fixed point, for measurements of the anterior portion of the lower jaw, we take the mental foramen, but here we must remember that the locality of this hole is not a constant one. Its anterior border is sometimes found (upon the lower jaws of adults,) between the two bicuspids, sometimes immediately under the first, and sometimes under the second, bicuspid, yes, even sometimes in a plane with the posterior canal surface of the second bicuspid. These variations occurring in a small number of lower jaws gives us a source of error of from 3 to four Mm.* We will not take any note of this, but keep in view the distance from the line of union of the two halves of the lower jaw (which is easily marked with a lead pencil) to the anterior

*A millimetre is the 25th part of an inch or two-fifths of a line.

border of the mental foramen. In a five month embyro, we obtained a distance of ten Mm. New born child, 12-13; in 4, 5, 6, 7, 8 and 9 months old children, 15-18 Mm. In 1, 2, 3, 4, 5 and 6 year old children, the distance remains nearly the same, 18-19 Mm; only in four cases they reached 20-23 Mm. In a child of the age of 1 year, five months and twenty-seven days, with erupted central incisors, 20; in one, one year ten months and ten days old with erupted first molars, 21; in one, five years old with a complete set of temporary teeth, 21; and in a child six years and one month old, with strong denture, 23 Mm. In 7, 8, 9, 10, 11, and 12 year old children, it varies between 22 and 24, and in comparative measurements of lower jaws of adults, between 23-25 and 29 Mm. If we overlook extreme cases, we will find the most important growth of this portion of the lower jaw in the first months after birth, and a stationary condition after the eruption of the deciduous teeth, but during second dentition we find an increase which at least amounts to three Mm. To meet the accusation that no regard has been had to the thickness of the facial wall, several measurements were taken after removal of the facial wall, there appeared however, as was to have been expected, no essential difference.

Further measurements, in the same manner, by means of a strip of paper, were taken on the facial side of the lower jaw along its whole length, and that is from the marked place of union of its halves, to the most prominent part of the condyloid process, which can be done so long as the latter does not protrude too much over the level of the alveolar ridge. This peripheral line amounts in a five-months embryo, to 40 Mm in one of seven months to 43; in the new born child from 45-52 Mm; increases up to the fourth month to 58, up to the seventh month to 62, up to the first year to 67, up to the end of the second year after the eruption of the first molar to 77, up to the fourth, fifth, and sixth year with complete deciduous set of teeth to from 78-85, and in a child seven years old with erupted permanent molars to 100 Mm. Beyond this age such measurements can not well be made. After subtraction of the anterior mass, from the median line of the inferior maxilla to the anterior border of the mental foramen, we obtain the rate of increase of the posterior mass from the last named

border to the condyloid process; and we obtain in this way an increase from 30-77 Mm., while we only had an increase of from 10-23 Mm. in the anterior mass. Hence the quotients are as 2.56: 2.3. The difference arises on account of the more extensive growth of the posterior division of the jaw.

J. Tomes has also used the tubercle on the lingual surface of the lower jaw to which are attached the genio glossus and genio hyoidens muscles, as starting points for measurements. According to my experience, these tubercles are so little prominent in the fœtus, or newly born child, and with children, and especially with adults, so different in form, size, and height, that the value of such measurements must appear very doubtful, especially as here small measures are of interest.

Measurements taken of the dental arch from the line of union of the jaw, and over the necks of the teeth along the alveolor border, and over the necks of the teeth to the posterior side of the cervical portion of the second molar; resulted, for half the deciduous arch, in from 32-34 Mm, and in the arch of the permanent teeth, to the same peripheral extent, in from 32-37 Mm. Hence, in many cases, the measurements of the deciduous denture agrees perfectly with the corresponding section of the permanent one, yes even the former measure may be found to be larger, but frequently we find an opposite difference.

In the same manner that the new layers of bone of the growing arch of the lower jaw are deposited upon the facial wall, and resorption progresses upon the lingual wall of the same, is the growth of the posterior portion of the arch accomplished; new layers of bone are deposited upon the posterior side of the ramus and condyloid process, while on the anterior side of the condyloid and coronoid processes, bone is resorbed.

G. Humphery has proved this experimentally. He introduced wires in the middle of the ascending ramus of the lower jaw of pigs, or nearer to the posterior or anterior border, and ascertained that, after a lapse of a certain time, the anterior loop was entirely free, while the posterior one was buried deeply in the posterior portion of the ramus. Something analagous he thinks occurs in the upper jaw, and upon the whole he agrees mainly with the opinion of J. Tomes.

If, then, the spaces occupied by theanterior ten teeth of the permanent set, and the teeth of the deciduous set are equal, the position of the former can not be affected by the premature extraction, or loss otherwise, of the latter, unless contraction of the jaw at the vacant place occurs. Does this happen? I know of cases in which the deciduous upper central incisors become quite loosened in consequence of complete absorption of their roots and were extracted. Their successor did not make their appearance for a year in one case, and nearly eighteen months in another, yet they found ample room, though the deciduous laterals were still *in situ*; and there were no apparent diminution of the original space.

Tomes thinks, even admitting that contraction of the jaw does take place, the pressure of the advancing permanent tooth would soon expand it again.

In the case of the second deciduous molars we have to guard against danger different from that of any possible contraction in the jaw; and the reasons against a premature extraction of these teeth are much less hypothetical. The first molar of the permanent set erupts at about the sixth year, whereas the successor to the second molar of the deciduous set does not make its appearance until the tenth to twelfth year. Now, it is easily to be understood, that if the deciduous molar is extracted before its successor is pretty well advanced, or before the first permanent molar is fully erupted, that this latter would gradually move forward, there being nothing to resist, and thus diminish the space intended for the anterior teeth."

No matter what the facts may be in regard to contraction of the bone, or whether this be prejudicial to the regular arrangement of the permanent teeth or not; there is a far weightier reason against premature extraction of childrens' teeth. Temporary teeth were not given to children merely to *reserve seats* for the permanent ones. The deciduous teeth, as well as the permanent ones, are intended as primary organs of digestion, and as such they perform a function which we must not loose sight of, in considering what course may be best to be pursued in any given case entrusted to our care. Premature loss of the molars must

affect mastication, which, not being properly performed, leaves so much more to be done by the stomach, this latter organ becoming overtaxed, the general health must suffer, and with this the permanent teeth. Caries in teeth, when resulting in pain and inflammation, may produce severe nervous irritation which, bring reflected upon the stomach, may seriously interfere with digestion; and hence assimilation will be imperfect, and nutrition of the growing tissues become impaired. If caries is allowed to advance until suppuration of the pulp or alveolar abscess ensue, an injurious direct influence is exerted upon the growing germs of the permanent teeth in its locality. Inflammation extending to their tender vessels and membranes, stops nutrition and causes a malformed, pitted, or grooved, or badly calcified permanent tooth. Aside from this local effect, general constitutional irritation is produced by reflex action with consequences as mentioned before.

Certainly these reasons alone are sufficient to preserve intact the temporary teeth until such a time as we may have reason to expect their successors.

Still, we must not extract these simply because their shedding time has arrived, unless there are sure indications that their successors are approaching, as we might occasionally, as in cases of hereditary transmission of a numerical deficiency, extract teeth which will never have a successor.

Loosening of the teeth is not the only indication we have of the advance of their successors. Indeed, sometimes this does not occur at all, absorption being by some cause retarded or prevented. When the permanent teeth advance in such cases, there it generally more or less uneasiness felt, and often it can be detected by an abnormal protuberance upon the bone, internally or externally, from the arch of the teeth.

I have in my own family a case in which the lower four incisors, and the upper centrals of the permanent set, are all that have as yet erupted, and the child is ten years old. There is no loosening of either the deciduous lateral incisors or of any of the deciduous first molars, yet, according to the tables, the former ought to have been shed about three years ago, and the latter certainly should have begun to vacate ere now.

There are no prominences to be felt to indicate the developement or advance of the permanent lateral incisors, and there is no loosening of the deciduous ones even now.

I certainly should feel exceedingly bad, had I extracted these teeth three years ago, and made the child go without teeth all this time; and who knows but what possibly there may never be any teeth of replacement, or they may not come until an advanced age.

After a close examination of all the points, we must then come to the conclusion: that deciduous teeth should be extracted when, from their diseased condition, extraction may prove the least of two evils, or whenever their room would be more desirable than their presence. Of these contingencies the operator should be capable to judge intelligently, before he attempts, with a ruthless hand, to remove these priceless gems.

Operative and Surgical Dentistry.

PYROXYLINE.

Having never redeemed the promise which we made to the readers of the JOURNAL long since, to give a report on the Brockway method of working pyroxyline for dental purposes, we propose doing so now; although, at this late day it may prove of little interest to many of our readers. We have deferred this report till this time in the vain hope that some plan would be devised for overcoming the obstacles in the way of its practical application as a base for artificial teeth. Ample time has now, we think, been given to test the merits of Dr. Brockway's method, if it possesses any, and also to improve his method of manipulation (if it were easily done), so as to do away with some of

the objections patent to every one who has made a trial of it. With no desire to undervalue a good thing, or to do injustice to any one, we make the following report for the good of whom it may concern.

We have been greatly disappointed in what we first thought would prove a valuable auxillary in the dental laboratory. About eight months' since we sought and obtained practical instructions in Dr. B's. method of working pyroxyline, and immediately put it to a practical test. We liked the appearance of the material; it seemed to possess all the properties requisite as a base—lightness, strength and elasticity; acids and the secretions found in the oral cavity seemed to have no action on it, and we were assured that it would not deteriorate on being worn in the mouth; was easily manipulated and would retain its shape and form without change. It contained nothing injurious, the little coloring matter being perfectly harmless.

Results have shown the claims of Dr. B. to be unfounded, otherwise the profession would now be using pyroxyline instead of rubber. We very soon became satisfied that it was not all that was claimed for it, that it would not answer our purpose as a base, unless some important improvements were made in the mode of working it, with this view we made some experiments, and succeeded only partially in overcoming some of the difficulties. The plates would spring from the die or mould after being swedged, especially if much of the solvent was used in attaching the teeth and rimming the plate. We have succeeded in overcoming this difficulty, so nearly that we experience but little trouble from this source. But another and more serious trouble is met with in attaching the teeth. In the first instructions given the teeth were to be backed by placing a quantity of the comminuted material around the rivets and then dissolving it with the solvent; we soon found that though we followed instructions closely, this formed a very poor attachment. The teeth would soon loosen and the case come to pieces. We improved upon this method of backing by using the sheet material with as little of the comminuted material as possible to fill around the rivets. We observed also that after a case had been worn a short time,

there would be more or less space underneath the blocks, forming a receptacle for particles of food, which, in time, became very offensive. After experimenting about two months, we received a call from Dr. Troutman, of the firm of Morrison & Troutman, Albany, manufacturers of pyroxyline base. He gave us some valuable hints, as he claimed, in the method of working it. To secure a firm foundation for the teeth, and prevent the shrinkage at this point, the result of which was the spaces we had observed, he filled all the space underneath the teeth with strips of the plate; or if the space was great, and the plate a lower one, he used tin filings to give the plate weight, if an upper one, cork filings to give it lightness.

We observed that a single tooth, as an incisor or bicuspid would soon get out out of position if attached in the usual manner. Dr. T. suggested the backing of these teeth with gold or silver plate, letting a strip of the backing extend from the base of the tooth into the base plate, as is often done with rubber. In this way this difficulty was effectually overcome. Dr. T. suggested several other minor improvements which did not affect materially the general result. The attachment of the teeth was still defective and would give way; the plate would change form and shrink from the teeth, and the whole process from the beginning to the end required the exercise of more care and patience than is often to be found in the mechanical branch of our profession at the present day. We were beginning to lose faith in pyroxyline, and was about giving it up when we received a paper from Boston, containing what purported to be the report of a committee, appointed by the Boston Dental Society, on pyroxyline. This committee, composed of men well known to the profession, after careful investigation and several months' trial, reported favorably. Surely, thought we, something must be wrong, we have missed it somewhere. We don't know as much as we thought, so at it we went again, again to be disappointed. About this time we received from Messrs. Brockway & Co., new instructions, some new apparatus, clamps, &c., also a specimen case. We found nothing new to us in the instructions, and we had already supplied ourselves with most of the apparatus, so we

gained no information or advantage from this lesson. We then instituted some inquiries about the report in the Boston paper, and learned that it was a fabrication; that no such report had been made, that, on the contrary, a very different report would be made and published at the next meeting of the Society. In the mean time our cases were coming back, some of them badly disintegrated, teeth loose, plate brittle, and in every way very unsatisfactory.

At the time of the meeting of the Missouri State Dental Association in June last, we received a call from a live Bostonian, a Dr. Bartlett, who said he had been sent out here by a Boston Pyroxyline Company, to show us how to work this new base successfully, as they were doing in Boston; this was good news to us who had spent time and money in vain efforts to accomplish what was said to be so easy. We felt like thanking the company in the name of the profession in the west for this act of kindness; and to the doctor who, as he assured us, had left his office and a large practice to pay this visit that we might be benefited, much praise was due. The Doctor showed us some very pretty specimens of the work, which he said were nothing compared to what might be done. These cases, said he, were just thrown together to show the different styles of the work. Most of the profession in Boston and the east had adopted it, and were using it almost exclusively. The Boston Dental Society recommended it, and no doubt it will take the place of rubber entirely, as soon as the mode of using it was understood.

The difficulties we had met with amounted to nothing; he could show us a way out of all our troubles. As our Association was then in session, we proposed that he should give the members the benefit of his instructions, which he kindly consented to do. Attending the meeting, he was invited to take part in the discussions, and was called upon to present the claims of his new base, and to show us how the thing was done in Boston. He favored the society with a brief history of pyroxyline, and the method of making it, and gave in detail his mode of manipulation in constructing a set of teeth on it. He stated the object of his visit to be two-fold; first, to show us how to use pyroxy-

line, and secondly, to sell stock in a Boston Dental Pyroxyline Company. We fear the doctor and his pyroxyline scheme was not appreciated, for he suddenly disappeared without opening his subscription books. When or where he went is still a mystery. In summing up the wonderful information which he had come three thousand miles to impart, the only item of which we were not already possessed was filling the spaces under the blocks with gutta percha.

We report pyroxoline a failure in St. Louis, and we have received the same report from several of our correspondents in other cities, Boston excepted. Why the profession in St. Louis and elsewhere are not in a measure as successful with this base as we are asked to believe they are at the Hub, we confess we cannot understand. With all due respect to Messrs. Brockway, Bartlett & Co., we are disposed to believe that the success of this base, even in Yankee land, is somewhat doubtful. Our Boston friends reckon without their host when they send agents to St. Louis, expecting the profession to take stock in any dental patent company. We have had quite too dear an experience with one Boston dental patent company to encourage another soon. We are making no further trials with pyroxyline, being satisfied with the experience we have had. Having replaced all the cases, save one, which we have put up in this base with gold, we say, goodby, humbug, "*R. I. P.*" EAMES.

Mechanical and Miscellaneous Department.

AMERICAN DENTAL ASSOCIATION.

The Association met at White Sulpher Springs, Greenbrier county, West Virginia, August 1st, 1871, at 11 o'clock A. M., Dr. W. H. Morgan, President, of Nashville, Tenn., in the chair.

On motion of Dr. Cushing, the reading of the minutes of the last meeting was dispensed with.

The Committee on Publication being called upon for their report, asked for further time, which was granted.

On motion, it was ordered that the Association hold sessions each day as follows: one from 10 o'clock A. M. to 1½ P. M., and one from 3½ to 6 o'clock P. M.

On motion, Drs. Salmon and J. B. Morrison were excused from acting on the Committee on Dental Appliances, and Drs. Walker and Canine were appointed to fill their places.

On motion, the President was authorized to fill vacancies in Standing Committees.

After some other preliminary business, the Association adjourned.

Afternoon Session.

The Association met at the appointed hour, Dr. Morgan in the chair.

Dr. H. Judd read a report upon Physiology, which was discussed by Drs. Atkinson, Taft and Judd, and others, until six o'clock, when the Association adjourned.

Wednesday Morning — August 2d.

Association met at 10 o'clock, President in the chair.

Minutes of previous meeting read and adopted. Discussion on Physiology resumed. Drs. Taft and Howe, of Cincinnati; Dr. McQuillen, of Philadelphia; Atkinson, of New York; and Judd, of St. Louis, took part in the discussion. Subject of Physiology passed. Dr. Wm. H. Atkinson read a report on Pathology, when Association adjourned.

Afternoon Session — Second Day.

Met at 3½ o'clock, P. M.

Dr. Harriman read a paper on Dental Histology, which led to considerable discussion. The unique features brought out in the papers, and in the ensuing discussion by the author, were

that the dentine was fibrous and not tubular, and that the pulp was made up of a *homogeneous mass of fibres and cells.*

The subject of Chemistry was brought up, and passed with little discussion.

A report on Dental Therapeutics by Dr. Bogue was read and referred to publishing committee.

The amendment to the Constitution, proposed at the last meeting at Nashville, relating to those who are interested in dental patents, was almost unanimously rejected.

On motion, it was ordered that a session be held to-morrow night for election of officers and for selection of a place for next meeting.

On motion, adjourned.

Tuesday Morning—Third Day.

The Association met at the usual hour. Letters from Dr. Chase, of St. Louis, and Dr. Moore, of South Carolina, were read.

The subject of "Dental Therapeutics" being still under consideration, it was discussed by Drs. Taft, Atkinson, Judd, and others. Subject passed and Association adjourned.

Afternoon Session—Third Day.

Dr. Dickerman read a paper upon "Anæsthesia," for which a vote of thanks was passed by the Association.

Report of Committee on Credentials was read and accepted, and candidates recommended, elected.

On motion, a committee was appointed to report suitable resolutions, expressive of the sense of the Association in relation to the death of Drs. H. E. Peebles, of St. Louis, and J. G. Willis, of Cincinnati.

On motion, ordered that the Association meet to-morrow morning at nine o'clock instead of ten as heretofore.

On motion, it was ordered that the morning session be opened with prayer.

The Corresponding Secretary read a letter from Dr. Barnum, thanking the Association for the flattering resolutions passed

last year at Nashville, by the Association, in relation to the Rubber Dam.

On motion, adjourned.

Night Session — Third Day.

The Association met at 8 o'clock P. M.

San Francisco and Niagara Falls were the most prominent places nominated for holding the next meeting, and, upon balloting, Niagara Falls received a majority of all the votes cast, and was declared to be selected as the place of next meeting.

The Association then proceeded to elect officers for the next year, with the following result:

President — Dr. Geo. H. Cushing, of Chicago.

1*st Vice President* — C. E. Francis, of New York.

2*d Vice President* — J. R. Walker, of New Orleans.

Recording Secretary — M. S. Dean, of Chicago.

Corresponding Secretary — J. A. Salmon, of Boston.

Treasurer — Wm. H. Goddard, of Louisville, Ky.

On motion, a committee was appointed to nominate Standing Committees for the ensuing year. Adjourned.

Friday Morning — Fourth Day.

Association met at 9 o'clock, President in the chair. Exercises opened by prayer.

The committee appointed to nominate Standing Committees reported as follows:

Physiology — McQuillen, C. F. Wheeler and A. B. Robbins.

Dental Pathology and Surgery — H. Judd, Wm. H. Atkinson and C. S. Smith.

Dental Histology and Microscopy — R. W. Varney, J. Taft and J. W. Allport.

Dental Chemistry — L. S. Dickerman, H. A. Smith and J. J. Birge.

Dental Therapeutics — U. L. Sage, J. R. Walker and Wm. N. Morrison.

Operative Dentistry — C. E. Francis, E. H. Bogue and Wm. Dutch.

Mechanical Dentistry—J. A. Salmon, Chas. F. Hickman and J. W. Smith.

Dental Education—W. H. Morgan, Geo. W. Keely and L. C. Cook.

Dental Literature—M. S. Dean, C. C. Chittenden and J. N. Crouse.

Prize Essays—Geo. A. Mills, E. Floyd and R. Hewe.

Ætiology—W. A. Branson, L. D. Shepard and R. G. Thomas.

On motion, the report of the committee was accepted, and the Committees elected as reported above.

The following resolution was adopted:

Resolved, That a committee of five upon Local Societies, and for conference with the profession be appointed by this body.

A paper by Dr. Cutler, was read upon "Ætiology" by Dr. Taft, which was referred to Committee on Publication.

Also a report upon "Operative Dentistry."

Discussion ensued upon filling with smooth points and platinum foil.

Dr. McQuillen spoke of the necessity of minute examination of the teeth.

Dr. Taft spoke of the necessity of using magnifying glasses.

Dr. Salmon spoke of filling teeth with slight pressure with smooth ivory pluggers.

On motion, subject passed.

Dr. Wm. N. Morrison read a short report on "Mechanical Dentistry."

Gold and platinum were universally admitted to be the best bases.

Dr. Walker recommended Watt's metal.

On motion, the subject passed. Adjourned.

Afternoon Session—Four O'clock.

The Committee appointed last year upon "Testimonial to Dr. Barnum for his Invention of the Rubber Dam," reported that they had prepared a medal to be presented to him, and the same was placed at the disposal of the Association. Dr. Barnum not being present, Dr. Geo. H. Cushing was appointed a committee of one to convey the medal to Dr. Barnum.

On motion, a vote of thanks was tendered to Drs. McKellops, Cushing and Allport, who presented the medal to the Association to be presented to Dr. Barnum.

The Committee on resolutions relating to the death of Dr. H. E. Peebles, and Dr. J. G. Willis, reported as follows:

The Committee appointed by this Association to report resolutions expressing the sense of this meeting upon the death of Dr. H. E. Peebles and Dr. J. G. Willis, members of this Association, beg leave to present the following:

Resolved, That this Association hear with regret the announcement of the death of Drs. H. E. Peebles and J. G. Willis, both of whom were present with us at our last annual meeting at Nashville.

Resolved, That in the death of Dr. H. E. Peebles, the profession has lost one of its most active and efficient members, whose labors in the field of dental education should be recognized by this Association as worthy of commendation. And that in the death of Dr. J. G. Willis, the profession has lost a member whose ability, energy of character and devotion to scientific pursuits gave promise of a brilliant future.

Resolved, That this Association extend to the relatives and friends of the deceased their heartfelt sympathy, but would congratulate them that their sorrow will nevertheless be somewhat alleviated by the reflection that their names are still cherished in grateful remembrance by their professional associates.

Resolved, That the Secretary be directed to forward to the families of the deceased a copy of these resolutions.

The report was unanimously adopted.

A report upon "Dental Literature," by Dr. Cushing, and a report by Dr. C. E. Francis, were read and briefly discussed.

On motion, Drs. Morrison and Cook were elected a committee to conduct the President elect to the chair, who, upon taking his seat, thanked the Association for the honor conferred upon him. The retiring President made some appropriate and well-timed remarks, and the Association adjourned. J.

THE MISSOURI STATE DENTAL ASSOCIATION.

The Missouri State Dental Association held its seventh annual session in St. Louis, June 7th, 8th, and 9th.

The Association met in the rooms of the Historical Society in the Polytechnic Institute.

Officers—President, Dr. Goodrich, Wentzville.

Vice Presidents, Dr. McCoy, Booneville, and Dr. Park, St. Louis.

Recording Secretary, Dr. Bowman, St. Louis.

Corresponding Secretary, Dr. Luckie, Mexico, Mo.

Treasurer, Dr. J. B. Morrison, St. Louis.

Executive Committee, Dr. Chase, Dr. Eames, and Dr. A. W. Morrison.

The meeting was called to order by President Goodrich, at nine o'clock A. M. The profession of Missouri was well represented; while a number of prominent Dentists from other States were present, and were invited to participate in the deliberations of the Association.

After the usual *business preliminary*, the Association proceeded to the consideration of the interests which brought it together.

At the session of 1870, the following gentlemen were appointed essayists for this occasion:

Histology, Dr. Judd, St. Louis.

Chemistry of the Saliva, Dr. Eames, St. Louis.

Treatment of Alveolar Abscess, Dr. Goodrich, Wentzville.

Irregularities of the Teeth, Dr. Forbes, St. Louis.

General Pathology in its relation to Filling the Teeth, Dr. Black, Jacksonville, Ills.

Contour Fillings, Dr. Park, St. Louis.

Gold Foils, Dr. Porre, St. Louis.

A slight departure from the programme was made by Dr. Judd's reading an essay on "The Status of the Dental Profession,"—instituting comparisons between it and the professions of Law, Divinity and Medicine, which were not particularly flatter-

ing to the dental profession at large. There were but few *scientists in its ranks*, as a profession more attention is given to the practical than to the *theoretical*. It was a comprehensive paper, calculated to stimulate, at least those who heard it, to more careful research and higher scientific attainments.

The principle *deductions* of the discussion which followed, were:

1st. A closer discrimination of the literary qualifications of candidates for the profession.

2d. A term of study of sufficient duration under competent instructors, to fully establish the principles of our specialty, and apply them in practice. For, certainly, so long as three weeks' or six months' embryo dentists are aborted, no reasonable mind can expect an educated pupil or an elevated profession. Nothing but the closest application and study will fit us, as dentists, for the responsible duties we owe to our patients, and teach successfully our students who are to succeed us.

Dr. Horine, of Missouri, read a volunteer essay entitled, "Teachings of the Past and our Duty to our Patients."

This paper briefly reviewed the improvements in Dental appliances made during the last few years, among which was a dental chair of his own design, made more especially for the travelling dentist. Its principal features are its lightness, great strength, comfort and small cost. He paid a handsome tribute to the Morrison chair, conceding for it the first place among dental chairs. "Our duty to our patients consisted, in great part, in relieving them of all possible pain in the preparation of cavities for filling." He advocated the administration of chloroform in small doses to keep the patient in a semi-anæsthetic state, under which he had performed, painlessly, many operations on sensitive teeth. Indeed, he rarely operated on any one without exhibiting it.

The discussion of this paper, so far as its reference to chloroform is concerned, became general, and we gather from it that it is a dangerous practice, one to be avoided, the necessity for it in small operations not commensurate with the risk, better to err (if at all) on the safe side. There were other agents quite as

efficient in obtunding sensitive dentine as chloroform, which occupy a position infinitely lower in the scale of dangerous agents. Chloroform is a great boon to humanity in those cases where its use is justifiable, but the general use of it in our offices, indiscriminately, as indicated by the paper, is regarded a dangerous precedent. It has been considered safe to exhibit it to a patient who may have come out safely from a previous exhibition, but this is an error, there is no safety but in touching not, handling not.

The following gentlemen were elected members of the Association:

G. W. Travis, Cape Girardeau, Mo.

L. L. Miles, Marshal, Mo.

H. R. Sackett, Marine, Ills.

A. H. Fuller; J. P. Eddy; H. H. Kieth; and H. A. Barlow, St. Louis, Mo. Adjourned.

Afternoon Session.

In the absence of the regular essayists the subject of "Nerve Capping with Oxy-chloride of Zinc," was taken up. Considerable interest was manifested in this subject; almost every member giving his experience, some against, but the majority for. In the hands of an intelligent practitioner there is hope of nearly every exposed nerve, where arterial circulation is present. Some were sanguine of pulps that had in part sloughed off. It was formerly thought the preparation should be put upon the nerve as dry as possible to ensure success, as it was the chloride of zinc that did the killing, in cases where death ensued. But it appeared a creamy consistency was preferable, on account of its offering less resistance to the pulp when placed in contact with it. In young patients it seems indicated, and better success is experienced than in adults of advanced years.

Dr. Bartlett, of Boston, here exhibited specimens of pyroxyline, the new base for artificial teeth. They were very neatly made, but did not excite the interest they otherwise would with the dentists of St. Louis, had their experience in its use been

more satisfactory. It seems to possess *kinks* that this western atmosphere is entirely inadequate to remove.

It was announced by the President that a demonstration of its merits would be made by Dr. B. on the following morning, at eight o'clock, at the office of Dr. Judd. Also clinics at the College Infirmary same hour. Operators, Dr. Moore, Lafayette, Ind.; Dr. Goodrich, Wentzville, Mo.; Drs. Judd, Forbes and Bowman, St. Louis.

Adjourned to 10 A. M., June 8.

Second Session—June 9.

Owing to the interesting character of the clinics there was no morning session, and the afternoon session was mostly devoted to business.

Election of Trustees to fill vacancies in the Board of Trustees of the Missouri Dental College:—Dr. Bowman was elected to fill the vacancy caused by the death of Dr. H. E. Peebles. Those whose term expired this year were re-elected for another term, Drs. Forbes, Gregory, McCoy and Kulp.

The Treasurer's books were audited and found correct. An assessment of three dollars was decided to be necessary to defray the expenses of this session.

On motion of Dr. Forbes, a committee was appointed to draft resolutions expressive of the sense of this Association on the death of Dr. H. E. Peebles. The President appointed Drs. Forbes, Judd and Eames. On motion, the President was added to the Committee.

Dr. Park read his paper in advocacy of "Contour Fillings." As this paper was published in the last number entire, it is unnecessary to further allude to it.

From the discussion which followed we gather that most of the Association approve and practice contour filling to a certain extent, but do not go to the extreme point indicated by some, of duplicating nature, even to working out the fissures and deviations from plain surfaces, on the ground that it was not necessary, using the time of both the patient and operator, without remu-

neration to either. The "happy mean" was considered the point at which to stop.

Dr. Forbes read a comprehensive paper on "Irregularities of the Teeth," which was attentively listened to. It will probably appear at length in the JOURNAL ere long, so it will be out of place here to extract from it, even to indicate the general tenor of it, which was, that the premature extraction of the deciduous teeth had no influence whatever in the development of the permanent teeth. It appeared from the discussion that the experience of individuals had not been in harmony with the teachings of the paper, and that the preservation, by any and all means, of the deciduous teeth, was the bounden duty of every dentist.

Dr. Hale gave notice that he should introduce, at the next meeting of this Association, a resolution to change the name of this Association to "Missouri State Association."

On motion, a ballot was had to determine the next place of meeting. Kansas City received the highest number of votes, and was declared the choice of the Association.

The report of the Secretary of the Board of Trustees of the Missouri Dental College was read and approved.

During the session of 1870-71 there were twenty-one attendants, of whom seven passed a satisfactory examination, and received the degree of "Doctor of Dental Surgery."

(To be continued.)

IOWA STATE DENTAL SOCIETY.

The ninth annual meeting of this society was held in the parlors of the Ogden House, Council Bluffs, on the evening of July 11th, 1871. Both the President and Vice-President being absent, Dr. Sanborn, of Tabor, was requested to act as President, *pro tem.*

Dr. Sanborn, as President of the Missouri Valley Dental Society, in well chosen words welcomed the dentists of the State

of Iowa to the Valley of the Missouri, and was responded to on behalf of the society by Dr. W. O. Kulp, of Muscatine.

Upon roll call the following members were found to be present:

P. T. Smith, Iowa City; W. O. Kulp, Muscatine; J. F. Sanborn, Tabor; R. S. Rathbun, Lyons; E. H. Dillingham, West Liberty; E. C. Chase, Iowa City; G. S. Shattuck, Belle Plaine; E. I. Woodbury, Council Bluffs; H. H. & H. W. Ray, Bellevue; I. P. Wilson, Burlington; J. S. Kulp, Muscatine; Geo. W. Auger, Brooklyn. Besides the above there were present several other dentists from the western part of the State.

Minutes of last year's meeting read and approved, after which the society adjourned.

Wednesday Morning.

Society met in the Court House in pursuance of the adjournment at the parlors of the Ogden House.

The President, Dr. Wilson, in the chair.

The Committee appointed at the previous meeting on order of business, made their report, which was unanimously adopted, and ordered to be incorporated in the By-Laws as Article VIII.

Under this new order of business, the meeting was formally opened by prayer by Dr. W. O. Kulp.

The committee on membership recommended the following for *active* members:

Geo. P. Mann, Des Moines; R. L. Harris, Atlantic; A. S. Billings, Onawa; F. N. Shriver, Glenwood; F. C. Clark, Council Bluffs; T. D. Studevant, Clarence; N. J. Waid, Newton; Dr. Dewey of Washington; A. J. Taylor, Hamburg.

For *junior* member, J. F. Kellogg, West Liberty.

These gentlemen were all unanimously elected members of the society, and signed the constitution.

Several old members forwarded satisfactory excuses for their absence, which were read by the Secretary. *Mister* Webster, of West Liberty, thinking he had been abused by the society at its last meeting at Iowa City, because he was not elected active member,—failing to pass the required examination,—requested

that his name be stricken from the rolls, at the same time threatening that he "would not pay any more dollars to the society." This request was unanimously, and most emphatically, granted.

Dr. Rathbun read an interesting paper on the "Cleansing of Teeth." The discussion which followed the reading of this paper was participated in by nearly all the members of the society, and occupied the entire time allotted for the morning session. Drs. John Austen, of St. Joseph, Mo., and Williams, of Council Bluffs, were elected honorary members. Adjournment till 2 P. M.

Afternoon Session.

Dr. Wilson read an essay, written by Dr. Hardman, of Muscatine, subject, "Phlebotomy."

Dr. Smith read an essay on "Dental Hygiene.

Dr. Ray read a paper on "Cell Life and Generation." Dr. Chase read an article on "Dental Chemistry." Each of these essays, after being thoroughly discussed, were referred to the Committee on Publication.

The subject of Dental Education was then taken up and discussed. This closed the afternoon session. The evening was spent by the members of the society at the residence of Dr. Woodbury, enjoying the hospitality of the doctor and his excellent lady, by whom they were elegantly entertained with refreshments. Here the members of the society met a great number of the prominent physicians of the place, and enjoyed a very pleasant social hour.

Thursday Morning Session.

Society met at the Court House, at 8: 30 A. M.

Minutes read and approved.

A letter from Dr. L. C. Ingersoll, of Keokuk, was read, explanatory of his absence, and giving in a condensed form his views on Dental Education, advising literary and scientific training as essential to success.

Dr. Shattuck read a long and very interesting essay on "Improvement in Practice and Elevation of Dentistry."

Dr. Wilson, President of the Society, read a paper on "Anæsthetics in Dentistry," of considerable merit.

Dr. Sanborn read a very elaborate article entitled "Oxygen and its Place in Vital Phenomena."

An essay was also read from Dr. Taylor, of Ft. Madison, subject, "Dental Surgery."

These papers were all thoroughly discussed in a highly scientific manner, which is peculiarly characteristic of members of this society.

Society adjourned to meet in the parlors of the Ogden House, at 1 P. M.

AFTERNOON SESSION.

President Dr. Wilson in the chair.

Dr. Woodbury then favored the society with an excellent address on "Professional Dignity."

After some discussion this subject was passed, and the subject of "New Bases for Artificial Teeth" was taken up. Dr. J. S. Kulp opening the discussion.

Drs. Charles, Paul, and Bond of Omaha, Neb., were unanimously elected honorary members of the society.

The subject of "Dental Legislation" being then in order, on motion, Drs. W. O. Kulp, Mann and Woodbury were appointed a committee to prepare a bill to be submitted to the next legislature, providing laws for the protection of the people against the imposition of quacks and incompetent persons calling themselves dentists.

The Missouri Valley Dental Association, and the Northern Iowa Dental Society, were invited to co-operate with the State Society in the same manner.

The Society next proceeded to the election of officers for the ensuing year, with the following result:

President—E. J. Woodbury, Council Bluffs.

Vice-Presidents—Ray Bros, Bellevue.

Recording Secretary and Treasurer—R. S. Rathbun, Lyons.

Corresponding Secretary—E. C. Chase, Iowa City.

Among the honored members of this society are two brothers, Ray, who resemble each other so closely that it is almost impos-

sible to distinguish one from the other. They are of the same age, they look alike, they dress alike, they talk alike, and in fact they have the appearance of both being the same person. This close resemblance was the cause of considerable merriment at the election of officers. The member who nominated Dr. Ray for Vice-President, declared, after the gentleman was elected, that he did not know which one he nominated. Amid much humor it was finally settled by electing them both to the office of Vice-President.

Dr. Sanborn, of the committee to whom was referred the subject of the obituary of deceased members during the past year, reported resolutions of condolence in the cases of Dr. Sayles, of Lyons, and Dr. Peebles, of St. Louis, Mo.

These resolutions were ordered to be spread upon the records of the society, and the Recording Secretary was ordered to furnish a copy to the Missouri Dental Journal.

The Corresponding Secretary made his annual report, the greater part of which related to the Chair of Dental Science in the medical department of the university. He stated that it was the wish of the faculty of said department for the Dental Society to recommend three persons to fill this chair, instead of one. The present lecturer, Dr. Smith, who was foremost in the establishment of this chair, and who was recommended by the society last year as a competent person to fill the place, considered this report to be a reflection upon his ability as a lecturer and a dentist.

Quite a sharp debate took place between Dr. Kulp, the Corresponding Secretary, and Dr. Smith, in which the latter showed the absurdity of such a proposition as that suggested by the former, viz., the appointment of *three* men to deliver *six* lectures to a class of medical students. Dr. Smith at the same time expressed his willingness to resign the position if the society so desired.

The whole subject was finally referred to the officers of the Society, for their conference with the faculty of the medical department of the university, to obtain, if possible, their views of the case.

The President then announced the following, as the standing committees for the ensuing year:

Executive Committee—Drs. Smith, Tulloss and Mann.
Membership " —Drs. W. O. Kulp, Sanborn and Wilson.
Publication " —Drs. Rathbun, Chase and J. S. Kulp.

Resolutions were adopted, thanking Col. Ross, of the Ogden House, the press, railroads and citizens; also Dr. and Mrs. Woodbury, for attentions shown us.

On motion it was ordered that any member of this society who should be present at the meeting of the American Dental Association, the State Medical Society, or the Illinois and Missouri State Dental Association, should be considered as a delegate to the same.

Bills for incidental expenses were allowed.

The society then adjourned, after a most delightful and successful session of nearly three days, to meet again on the second Tuesday of July, 1872, at the city of Des Moines.

This was probably one of the pleasantest, as well as one of the most profitable, meetings the society ever held. The attendance was greater than the most sanguine dared to anticipate. The essays showed steady and scientific research, and were excellently written, and would bear comparison with those of any other scientific society in the country. The discussions evinced a thorough knowledge on the part of the participants of all those subjects connected directly or indirectly with our specialty, and the members returned to their respective homes, feeling as if they had been amply repaid for the trouble and expense of attending this meeting, and fully determined to add still more to their stock of scientific knowledge by study, research and observation, and do all in their power to elevate the professional standing of themselves and each other in the communities in which they reside; thus, by individual improvement, to place the dental profession on an equality with the other learned professions, where it properly belongs and will eventually stand.

EDWARD C. CHASE, Corresponding Secretary.

BIBLIOGRAPHICAL.

An address, published in pamphlet form, delivered before the Merrimac Valley Dental Society by A. P. Stevens, D. D. S., is before us. The subject is "Charletans and Empirics," which all will confess, furnishes anything but a pleasant theme for a lecture, but which the author has nevertheless turned to good account in the present production. J.

The Thirteenth Annual Commencement of the Chicago Med. College has made its appearance, containing a catalogue of the class of the last session, by which we learn that the class of 1870-71 numbered 107 students and turned out 30 graduates, including four Ad. Eundem and two honorary degrees. The granting of ad. eundem degrees we consider in bad taste; and the time will soon come, we hope, when honorary degrees, conferred by medical or dental colleges, will not be very highly esteemed; in fact, the practice should be at once abandoned, unless it be bestowed as a reward upon some one who has done something, and shed lustre upon his profession. J.

The Transactions of the American Dental Association for the session of 1870 have come to hand, and we have given the book a cursory examination. We think the report, all things considered, a good one; and from the examination given it, we are inclined to believe that the true intent of the speakers on the various discussions is better brought 'out than has been the case generally, in similar reports, though the language used in some instances, may not be as appropriate and elegant as an exact verbatim report would have made it, though it may be also presumed that in other cases the slight departure from the original will not detract from their *dictional* perfections.

The volume contains one hundred and sixty-eight pages, is printed on good paper and in plain type, and shows that the Publishing Committee have done their whole duty in the accomplishment of their arduous task. J.

JOURNALISTIC.

In the "*Medical Record*" we find a report of a case of obstinate neuralgia, cured by sulphate of nickel, given in from one half to one grain doses three times a day. The report was copied from the "*Oregon Medical and Surgical Repository.*"

The Medical Gazette gives analyses of several secret remedies and quack nostrums, which do not smell as sweet when robbed of their attractive names and shown up in their true colors. For example, the French pomade, known as "Pomade Tannique," is found to consist of perfumed lard, 65 parts, sugar of lead 25 parts, and flour of sulphur 7 parts, without a trace of tannin, as the name would indicate. And many other preparations for which large prices are usually paid, are as simple preparations and just about as useless.

The American Journal of Dental Science for July, commences with an article by Prof. P. H. Austin, entitled "Dentistry." The article is written with much care, and is in striking contrast with many articles found in the journals. It is well conceived and well written, and may be pointed out as a philosophical production and a fine specimen of English composition.

We call attention to a few extracts. His definition of "Dentistry" is short and to the point, as follows: "Dentistry is the science of medicine applied to the dental organs. * * * * The anatomy, physiology and pathology of dentistry differ in no respect from that taught in medical schools. * * * * The problem of medical education is one of difficult solution. While European systems seek to make 'experts' of students, American systems are content to make them 'experimenters.' The old world regards three or four years of extra study a small matter compared with the lives and welfare of the community; the new world considers any risk preferable to such delay in entering upon the practical duties of life. * * * * * Few minds can even approach that universality of genius

which characterized Hypocrates and John Hunter; hence elevation to a specialty of medical art detracts nothing from the position which a man's education and talent entitle him to assume. If no early education has given habits of study, the fascinations of hard work are permitted to engross time that should be given to the harder and more distasteful headwork.

"The training, thus commencing and ending in mechanism, is discreditable, not because of its mechanism, but because being one-sided and partial, it necessarily fails to accomplish that which it promises.

"Such training may make dental laborers, tradesmen or artizans, but never dental artists or scientific mechanicians; nor can the dentistry which they practice be in any respect identified with that which we have defined as a branch of the art of medicine. A preparation begun in pure science may end in correct practice, and the early habits of student life may follow the professional man throughout his career; but a preparation begun in practice will end there.

"The routine of professional duties often tempt the scholar to sink into the mere practitioner; it is rare, indeed, that one reverses the order of nature, and sets aside the claims and emoluments of practice to acquire slowly those habits of study so easily learned in youth.

"It requires the broadest literary and classical education of boyhood to counteract the necessarily narrowing influence of the professional studies of manhood; and it demands the largest possible infusion of scientific teaching during professional pupilage, to correct the matter-of-fact influence of practice.

"In this lies the great error of American systems of education." J.

OBITUARY.

Died, in the City of New York, October 30th, 1870, Dr. Peter Preterre, M. D., D. D. S., aged fifty-eight years. He was the oldest of four brothers, all practising dentistry, and a graduate of the Pennsylvania College of Dental Surgery.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] SEPTEMBER, 1871. [No. 9.

From The Pharmacist.

ON FERMENTATION.

By Professor A. W. WILLIAMSON, F. R. S. Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 287.)

In referring, at our last meeting, to the place in nature which ought to be assigned to these little organisms of which we have been speaking, — the ferments, — I stated one ground which appeared to me conclusive, or very nearly so, for placing them in the animal and not in the vegetable kingdom. The ground was a chemical one, viz., that these organs assimilate, or, to use a homely phrase, they feed upon very complex substances, and they give off, during their vital functions, less complex substances. That circumstance appears chemically conclusive in favor of their being rather animals than plants, for plants build up complex substances, and animals assimilate the products which plants have formed, and break them up into simpler ones. There are, however, two other considerations which I think are of such importance that it would be undesirable to pass them over, which tend in the same direction, and are striking confirmations of the conclusion to which we then came. The one is, that whereas plants require for their growth the light of the sun—in fact, their very

growth is a process of absorption of heat by their leaves from the rays of the sun—and plants by doing so render heat latent, as we sometimes express it, that is, they cause an apparent disappearance of heat, and lower the temperature of the surrounding space; animals, on the contrary, give off heat during the exercise of their vital functions, and do not need to be exposed to heat or to continuous light for their growth. Now, in both these respects, as in the other respects, these little cells, the ferments, appear to be distinctly animals. I do not know of one case of a ferment requiring or using for its vital processes the light of the sun; they usually grow, and they seem to thrive quite well in the dark. Again, there are well-known cases in which, during their vital functions, they evolve or give off heat, so that I think these are very overwhelming reasons for not considering them as vegetables in their functions, but rather as animals or animal atoms. I have on the table here three or four liquids, which are in the state of fermentation, of which I have already had occasion to speak several times. The first carboy contains an extract of malt, to which common cane sugar has been added, and some brisk, thriving yeast was then introduced. Effervescence is now rapidly going on, as you may hear by the gas—carbonic acid—which is escaping through the bent tube into the vessel containing lime-water. This liquid contains little soft, nearly round particles, which I was just speaking of as animals, though they certainly do not look like animals. The second flask contains another substance, of which I also spoke the other evening. There is here what I might call gastric juice—it is a mixture made for the purpose of getting lactic acid from sugar. Some pepsine was made to digest a certain quantity of white of egg, and that mixture, whilst still acid, I mixed with some common cane sugar, and put into it some alcoholic ferment, or common yeast. A good deal of the yeast was digested, it disappeared and was dissolved. I thereupon put in more and more, until there was an excess of it left in the flask. It was then kept for upwards of a week in a box which I have been using for the purpose of these fermentations—a metalic box, which is kept, by means of a regulated gas-burner, at a

temperature of about 30° Centigrade, or a little above blood heat. During that time the substance has been gradually undergoing a change or fermentation. It became strongly acid, and I then added a base, at one time potash, and afterwards powdered marble or carbonate of lime, which was dissolved by the acid, and thus a quantity of lactic acid was formed. Here also there are little cells, which, under the microscope, can be seen to be different from those in the first mixture. They are smaller in their dimensions, but yet they present no very marked individual characteristics by which they can be identified. Indeed, the chief, or, I may almost say, the only thing by which we can certainly identify any one of these organisms is by setting it to work, and by seeing what work it performs. In the third carboy I have a mixture which had gone through the phase I have just been speaking of; it contained some sugar with lactic ferment, but when all the sugar had disappeared, and was transformed into lactic acid, I left the carboy in the same warm chamber, and another fermentation has set in, and there is already a considerable quantity of the substance called butyric acid present, and the greater part, if not the whole, of the lactic acid has already passed over into the butyric acid. Here, in this glass dish, there is another ferment still, although, unfortunately, it has got disturbed in coming here. It contained a decoction of yeast, with which was put about 2 per cent. of pure vinegar, and about 4 per cent. of alcohol, and I then touched the surface of the liquid, which was perfectly clear, with a glass rod which had been in contact with the vinegar-plant, and left some little particles floating on the surface of the liquid. These little particles, in the course of a day or two, spread over the liquid, and when this vessel came from University College this morning it was covered with a perfectly uniform film, consisting of little cells different from each of the others to which I have called your attention, and quite distinguishable under the microscope. I should state that after the mixture was first made, and after the vinegar-cells were put into it and allowed to grow on it, I supplied them with some additional food twice. On one occasion I added a somewhat larger quantity of alcohol than was in-

tended, and the effect was that the cells were most injuriously affected.

They constituted a dense, smooth, white film, and this seemed almost to disappear, and on examination under the microscope it was found that they had shrunk — in fact, they had been killed by a too strong dose of alcohol. This was then allowed to evaporate, and the vinegar-cells very soon again spread over the liquid. I will now commence in another dish a similar experiment. I have in this bottle a mixture of yeast-water and alcohol, with a few drops of acetic acid in it. I will pour this into the glass dish, and then put on to the surface some of these little ferments which I have here, and I have no doubt that if we allow this mixture to stand we shall find by our next meeting that it will be covered over with a smooth film, consisting of vinegar-cells, which will be transforming the alcohol into acetic acid. I may show you the strength of the acid in this last instance by putting into it a slip of blue test-paper which you see is immediately colored a deep red.

With regard to the process by which these cells are propagated some exceedingly interesting experiments have been made under the microscope. Professor Mitscherlich and various others, — Pasteur among them, — have put little alcoholic cells under the microscope, putting them first into a liquid upon which they could feed, and they have noticed that the cells, or some of them, gradually swelled out at one side, — that a little wart, if I may use the expression, made its appearance on one side; that this increased in size until it became as large as the original cell, and then it became detached. The propagation of the alcohol cells, the wine ferment, has been seen by several observers to take place by a process of budding. I will show you the growing cells, by throwing on the screen, by means of an oxy-hydrogen lantern, a photograph of the wine ferment, some of which will, I believe, show a little excrescence at the side, and the general arrangement of the cells will be easily detected. This is a photograph from a plate of Pasteur's, and conveys an exact representation of the appearance which the alcohol cells ordinarily present. I will now show you the photograph of the acetic fer-

ments, and the difference in the general appearance is very striking. When examined carefully, it will be found that these little vinegar cells are in couples, little masses about twice as long as they are broad, and by degrees they become strangulated at the waist, and ultimately separate. With a considerable magnifying power, it has been found that the wine cells contain granulated particles, but exceedingly little is yet known of their structure. Certainly one of the most promising directions for investigation in the phenomena of life is presented by the study of these various little organisms, which we have so completely under our control.

With regard to the processes by which these cells are propagated, I have mentioned already, that when certain liquids, capable of undergoing decomposition, are exposed to the air, some little cells gradually make their appearance in what was at first quite an unaccountable manner. It was long supposed, and on very good authority, that the oxygen of the air was the active agent in transforming a fermentable substance into these little cells; and Gay-Lussac, one of the ablest of French chemists, who died a short time ago, made some very careful experiments with a view to decide that point. They led him to the conclusion that oxygen was all that was needed in order to initiate the process of fermentation in the juice of grapes, which by itself does not ferment. It is worth while to state, in general terms, the nature of these experiments. He put into a glass vessel, closed by mercury, a small quantity of grape juice, which was expressed under mercury, so that it did not come in contact with air on its way into the glass jar intended to receive it. This was then kept closed for some time without change. He then introduced oxygen, sometimes from the atmosphere—I am now giving you an account partly of what was done by Gay-Lussac, and partly what was done by others—and sometimes the oxygen was derived from potassic chlorate. Air was used which had passed through red-hot tubes, so that any vital organisms in it must have been destroyed before reaching the grape juice; and it was found that, in these cases, the access of the air to the substance did induce the formation of yeast-cells, and did induce

a process of alcoholic fermentation in the liquid by their growth. The conclusion, therefore, appeared to be established that oxygen was all that was needed for the process. Since that time, however, other experiments have been made, with precautions which were not observed by Gay-Lussac; and I must especially quote a truly masterly investigator, Pasteur, whose extraordinary researches in this subject have certainly constituted an important era in our knowledge of it. Pasteur has made a great number of experiments, partly such as those which had been made before, and partly fresh ones, of which I will describe a few characteristic samples. For instance, he took little glass bulbs, with a long neck bent in several places, like the one I hold in my hand. This little bulb contains some yeast-water, and also about 10 per cent. of sugar, a mixture which is peculiarly susceptible of undergoing fermentation and decompositions of various kinds. When this was introduced into such a bulb, Pasteur boiled the liquid for some time, so that any little living particles which might have entered the bulb with the liquid, by being exposed to the temperature of boiling water, might be killed, and also that any particles which might be lodged in the neck of the flask would be similarly treated and killed. Some of these bulbs he closed, sealing up the tubes whilst still full of steam, and he then put them by in a warm chamber, similar to that which I just now alluded to as being of the temperature of 30° Centigrade, so that they should be under the conditions most favorable to the development of any little living organisms, if such could develope themselves. He so kept them for days, weeks, and months, and I am not sure that he did not keep some for years, and at the end of the whole time he found that in no case was there the production of these vital organisms. I told you that when the tube was closed the vessel was full of steam; of course that steam was condensed on cooling, and left a partial vacuum above the liquid, and when Pasteur opened the tube by breaking off the point, the air rushed in violently to fill the vacant space. He found that in almost every case, although not in all, after this air had rushed in, a process of decomposition commenced, and in some cases he found little animalcules,

and various kinds of mould in others, and he has described a considerable number of different organisms which he got in different bulbs in that manner. It so happened, also, that in one case the tube, I think accidentally, at first remained unsealed, —that it was not kept from contact with the air, as the others were; still, to his amazement, Pasteur found that even in this one which remained open there were no organisms,—that it remained as unchanged as those which were sealed up. Finding this, he repeated the experiment many times, making a great number of bulbs similar to the first, putting some of that same liquid into them, and boiling the liquid for some time, so as to destroy any organisms; but, when they had been killed, he left the bulbs open, and he found that the contents were as effectually protected by the conditions there present as if the tubes had been sealed. He submitted the results to several members of the French Academy; the experiment was repeated by other persons, and the results showed—if there were any exceptions I do not remember hearing of them—that no organisms were produced. You will notice that the liquid which had been boiled was separated by a long, thin tube from the outer air, and the air only had access to it through this long, narrow, tortuous passage, which, moreover, was at first wet inside, because of the condensed steam. Pasteur then cut off some of the tubes, so as to allow free access of air to the contents, without having to pass through this long, narrow tube, and soon after that was done the process of decomposition set in, and he got various organisms formed in his mixture, which developed themselves in the way yeast, mould, and such-like organisms generally do.

I will now leave these experiments for the present, in order that I may tell you of some other discoveries, which will afford a key to them. One of the most important observations was made, at an early stage of the investigations, on the subject of ferments, by Dr. Schwann. He passed air through a red-hot tube, and he asserted, as the result of his observations, that air which had been so heated was incapable of producing the effects which I mentioned just now as having been noticed by other observers as produced by common air; that, whereas ordinary

air starts fermentation, air which has been passed through a red-hot tube does not. That was what he said, and in some of his observations he was quite correct, but in some others he must have been misled. Shortly after his observations, another German philosopher thought of using cotton-wool as a strainer. He passed air through a glass tube fitted up somewhat in the same manner as the one I have here, with a tolerably compact plug of cotton-wool, which allowed the air to pass through it, but at the same time acted as a strainer, and collected a quantity of dirt at the side where the air entered it; and he found that the air which had been thus strained was no longer capable of producing the phenomena of decomposition, which air in the unstrained or unheated state does. Since then, Pasteur has done the same thing in a more accurate and more decisive manner; and he has repeated the experiment with heated air, with precautions which leave nothing to be desired. One novelty in Pasteur's process is the use of a kind of cotton which is soluble—cotton which has been in contact with strong nitric acid, which is called gun-cotton. It retains the structure and appearance of ordinary cotton, but has this peculiarity, that it dissolves easily in a mixture of alcohol and ether. He put into a tube a plug of this gun-cotton, and then, by means of an aspirator, he drew air through this strainer for a long time, until he had collected quite a quantity of dust. He then took this gun-cotton, with the dust upon it, and put it into a tube, where he poured alcohol and ether upon it until the cotton was dissolved, and nothing left but the dust. In that manner he got the lightest portions of the dust and the heavier portions by themselves, as they very soon subsided in the liquid in which the gun-cotton had been dissolved. He then poured fresh alcohol upon them, so as to thoroughly cleanse them, and then put them under the microscope, in order to examine the particles of which they consisted. He found in this dust a great many particles of sand, calcic carbonate, and other mineral particles, as would naturally be expected, and also a great quantity of organic matter—little particles of cotton-wool, wood, and so on; and mixed with these he found some little spherical or oblong particles of very different sizes,

and of some considerable varieties of shape. Some of these little round particles he found consisted of mere starch, and many of you are, no doubt, aware that starch consists of little spheroidal masses of different sizes. These he got rid of by a solvent, and others were then left, which resembled, in their appearance, so closely the germs of various fungi and organisms of those kinds, and eggs of animalcules, that they were, to outward appearances, undistinguishable from them. He then took a liquid which had been boiled, but which was capable of decomposing—such a one as I mentioned here—by the action of any of these substances, and he put it into a flask, with precautions which I will not detain you by mentioning now, more than to say that he slid into this liquid, which had not got anything present to induce the formation of organisms, some of the gun-cotton with the dust yet in it. It was the same thing as I mentioned before, only that the substance had got some of this dust from the air added to it; and he found that he also got the formation of organisms very readily and abundantly. He found that these little particles, which were to the eye undistinguishable from germs and spores, behave towards liquids of this kind just as if they were so. In various other ways the same form of experiment has been repeated, and uniformly with the same result, viz., that when little particles collected from the air, particles of extreme tenuity, are put into a liquid susceptible of undergoing decomposition, a great variety of organisms will make their appearance, just as if their seed had been sown in the liquid. This circumstance is one which, I think, will justify us in going back to what I told you of Pasteur's previous observations. I told you that he opened a number of the little bulbs which had contained yeast-water and sugar, so as to allow the air to rush into them. He found that, in some cases, he got one kind of organism produced, and in others another; in fact, he got a great variety. But if, instead of allowing the air to go into these bulbs in this way, he poured the liquid out into an open vessel, he always got the same sort of organisms; there was no variety. The appearance of the particles which resembled germs is, as I said, exceedingly various, and there are many reasons to suppose that if there are the germs of

these organisms in the air, there must be an immense variety of them—a variety so great that we could not even venture to guess at its extent at present. When the liquid had free access to all of them, it is found, for reasons which would easily suggest themselves, on reflection, to anybody, that some of them—those which can thrive best upon the particular substance—develope themselves to the exclusion of the rest. I will give you one or two examples of the influence of food upon the development of ferments—instances which are well known, and are of some importance, as serving to prove the point I have just mentioned. You are aware that the mixture which I have been speaking of, yeast-water with sugar, can be made to undergo alcoholic fermentation. I have already referred to it repeatedly in that point of view. We can make it undergo alcoholic fermentation if we put some alcoholic ferment into it, and keep it at a proper temperature; but if, instead of putting some number of cells—and even a few grains weight consist of an enormous number of cells—if, instead of that, we were merely to leave some of this liquid in contact with the air, we should have no alcoholic fermentation set up in it. That particular mixture of yeast-water and sugar does not, when exposed to all these germs, get yeast-cells developed in it; at all events, not to any perceptible extent. Instead of that, it gets cells formed which are similar to those in the second bottle I showed you, which is forming lactic acid—that is to say, the lactic fermentation will set in. The fact is, that the liquid is unwholesome for these particular cells; and does not agree with the alcohol-cells, or yeast-cells, so that, if a great number of various germs are thrown into these particular substances, those which can thrive better, which are the lactic acid-cells, develope themselves, and the alcohol-cells do not. Again: if, instead of taking this decoction of yeast and sugar, you were to take some grape juice, you would have alcoholic fermentation at once. That is the way it is done. If I were to leave a decoction of malt in contact with the air, in the same manner you would get the same thing set in, as a rule. Again, if some of the liquid which I have in the glass dish here—some of the yeast-water with a little alcohol and acetic acid—be left

in an open vessel, it gets an organism formed upon it; in fact, that is a process which Pasteur recommends for getting vinegar-cells, if you want any. He says the air will, if you give it time, and supply the requisite conditions, start these cells in that mixture, but no alcohol-cells, nor lactic acid-cells, can be grown in it. It does not suit them; it is a substance which suits vinegar-cells, and them only. Whatever may be the variety of the cells present in the air, it only developes those of that particular kind.

(To be continued.)

STRUCTURE OF THE RED BLOOD-CORPUSCLES.

Nothing can better illustrate the difficulties that beset the determination of the minute points of microscopical inquiry than the discrepancy of opinion that exists amongst the best observers in regard to the structure of the red blood-corpuscle. For many years it was held to be indisputably a cell, and to consist of a definite cell-wall enclosing cell-contents. For some time past, however, a change of opinion has been visible; and in most of our text-books of physiology, if it be not expressly stated, it is at least hinted at as probable, that the corpuscles are homogeneous semi-solid bodies, the surface of which may perhaps be a little more condensed than the interior. The remarkable experiments of Mr. Roberts, of Manchester, on the action of the anilin and tannin, though at first apparently in favor of the cell theory, were yet subsequently considered to be explicable on the theory of homogeneity, by supposing that these agents hardened the surface, and so led to the phenomena observed. The peculiarity and persistence of the form of the red-corpuscles, and their behavior on the application of pressure, are certainly in favor of this latter view. A paper, however, by Dr. Joseph Richardson, of Philadelphia, which we have just received, speaks strongly in favor of the old cellular view. This gentleman's experiments were conducted upon the Menobranchus, which he obtained from the Cayuga lake in Western New York, the blood corpuscles of

which animal are, as is well known, gigantic, being about 216 times larger than those of man. In endeavoring to discover some indications of the presence of a cell-wall, he found quite unexpectedly that the colored portion possesses the remarkable property of crystalising with great readiness *within* its envelope. Dr. Richardson states that, on slightly concentrating the blood of this animal, one or two crystals form in almost every corpuscle; and the effect of their formation and elongation is precisely what we might expect to be produced by bodies of similar shape contained within an ordinary bladder partially filled with fluid, the ends of the corpuscle being in some instances thrust out till the length becomes a third greater and its breadth correspondingly diminished, the nucleus being closely compressed against the prism. In other instances, where the corpuscles lie across, the whole corpuscle assumes a lozenge or rectangular form, in which state it may be mounted dry. Dr. Richardson further argues —though this is less satisfactory evidence—that on briskly stirring freshly drawn blood with several times its volume of water the coloring matter can be withdrawn, leaving the cell membrane intact. And, finally, he has succeeded in dividing a corpuscle under the microscope with a sharp needle; the contents escaped, while the cell-wall shrank up around the nucleus into a perfectly hyaline particle. From these researches he concludes that the older theory, which asserts that the red corpuscle of the vertebrates generally are vesicles, each composed of a delicate, colorless, inelastic, porous, and perfectly flexible cell-wall, enclosing a colored fluid, which is sometime crystallisable and is freely miscible with water, explains the physical phenomena presented by the red globule far more satisfactorily than any other hypothesis that has hitherto been advanced.

Without disputing the accuracy of the observations here recorded in reference to the corpuscles of the Amphibia, we would just remark that it by no means follows that the structure of the corpuscles of the higher animals is at all similar; and we are still disposed to hold the opinion of Mr. Gulliver, that, in mammals at least, the red corpuscles are nuclei, and as such are probably homogeneous in composition, and destitute at any rate of a proper cell-wall.—*London Lancet.*

ULTIMATE DISTRIBUTION OF THE NERVES IN THE TAIL OF THE TADPOLE.

In a recent essay published by Dr. E. Klein in the Reports of the meetings of the Academy of Vienna, he gives the results of his observations on this delicate point of minute anatomy, which essentially corroborate the views of Dr. Beale, showing that the ultimate terminations of the nerves form loops. Dr. Klein describes the principal nerve trunks as undergoing subdivision, till at length there are only anastomosing non-medullated fibres, which, however, exhibit clearly the fibrillar structure of axis cylinders. From this web, fine pale fibres proceed, which form a second plexus beneath the sub-epithelial hyaline layer. At tolerably regular distances, these fibres exhibit fusiform swellings, each with nucleus and nucleolus (bipolar ganglion cells). From this, again, the finest branches are given off, which form a plexus immediately beneath the epithelium, and amongst them are distributed bodies that appear to be multipolar ganglion cells. Dr. Klein was unable to observe any communication between the fibres of the finest sub-epithelial plexus and the epithelium, or any other of the tissues of the tail of the tadpole.

Operative and Surgical Dentistry.

LACTO-PHOSPHATE OF LIME.

We are indebted to Prof. B. W. McCready for the following note on the lacto-phosphate of lime:—

There are strong grounds for the belief that, besides being a necessary ingredient of the hard parts of vertebrated animals, the phosphate of lime is intimately connected with the process of

cell-formation. According to Lehmann, it is found in appreciable quantity wherever cells or fibres are formed, even in those inferior animals in the hard parts of which the phosphate is replaced by the carbonate of lime; it is more abundant in the plastic secretions from wounds than in the serum of the blood; it is less abundant in the venous blood derived from parts, as the muscles, in which the metamorphosis of tissue is greatest, than in that coming from parts of inferior vital activity.

The phosphate of lime has been recommended in various forms of imperfect or depraved nutrition, particularly in cases of rickets; and the experiments of Milne Edwards seem to show that, under its use, fractured bones in dogs and rabbits show a quicker and more abundant formation of callus. It, however, has never obtained the general confidence of the profession. In a series of articles in the *Archives Générales de Médecine*, for December, 1869, and for January and February, 1870, Dr. L. Dusart, reviews the whole subject, and, attributing the unsatisfactory results heretofore obtained to the great insolubility of the ordinary phosphate, recommends the use of a new preparation, which he terms the lacto-phosphate of lime, in which the lime-salt is dissolved in free lactic acid.

M. Dusart finds—1. That the lacto-phosphate of lime injected through a fistulous opening into the stomach of a dog, during digestion, is not precipitated by the contents of the stomach, but remains dissolved in the chyme.

2. That in comparative experiments made on guinea-pigs, in which the bones of one of the extremities were fractured, that in the animals submitted to the action of the lacto-phosphated lime, the callus was more voluminous, and the consolidation of the bone more perfect, than in those submitted to a similar regimen, with the exception of the lime-salt.

3. In four cases of tardy union of bone observed in the Hôpital Beaujon, the administration of the lacto-phosphate was attended with marked improvement of the fractured part; in three of the patients, the appetite was at the same time greatly increased.

4. In a number of cases of rachitis, the influence of the lacto-

phosphate was well-marked, the children rapidly improving under its administration, the appetite at the same time being greatly increased.

5. Several cases of diarrhœa and indigestion, after resisting other treatment, quickly yielded to the influence of the lacto-phosphate.

At my request, Mr. W. Neergaard, pharmaceutist, prepared for me, in June last, a syrup, by dissolving recently-precipitated phosphate of lime in concentrated lactic acid, and then adding a convenient amount of syrup. I have found it useful—

1. In cases of defective nutrition, with or without diarrhœa, but without any acute disease of the alimentary canal, particularly when these conditions have occurred in prematurely weaned children.

2. In rachitis.

3. In atonic dyspepsia. In most of these cases, not only were the digestive power and nutrition of the patient greatly improved, but the appetite for food was augmented, sometimes to an extraordinary degree. Dr. William A. Hammond has found it of very great value in cases of nervous derangement, attended with impaired nutrition; and Dr. Barstow, of Sandford Hall, had used it largely in similar cases. It is very probable that the free lactic acid may, in many instances, contribute greatly to the efficiency of the preparation.

In forming the syrup of the lacto-phosphate, Mr. Neergaard obtains the phosphate of lime, according to the United States Pharmacopœia, by acting on bone earth with muriatic acid, and precipitating the dissolved phosphate with ammonia. He saturates an ounce of concentrated lactic acid with the recent precipitate, and to the clear solution he adds six ounces and a half of water, an ounce and a half of orangeflower water, and twelve ounces of sugar. Prepared in this manner, the syrup will contain from fifteen to twenty grains of phosphate of lime to the ounce. The variation in strength is caused by the want of uniformity in the strength of the lactic acid; that furnished by the best manufacturer—Merck, of Darmstadt—varying considerably in its degrees of concentration. The dose for a young child is one to two

drachms three or four times a day, while an adult may take a tablespoonful frequently. The taste is pleasantly acid, and the syrup is not apt to disagree even with delicate stomachs.—*N. Y. Med. Jour.*

AN EXPERIMENT.

Having at various times noted, in the dental periodicals, instances of replacement of luxated teeth with favorable results, I concluded to experiment in that direction, and having in my own mouth an ulcerated tooth, which proved to be one of those incurable cases sometimes met with; after enduring much pain and no little vexation, as a *dernier resort* I concluded to have it extracted and replaced, more as an experiment than from any hope that it would be a success. Nature having failed to supply me with the superior right lateral incisor, the eye-tooth occupied its place, and the first bicuspid the place of the latter, virtually making the bi. a front tooth—and hence a particular desire to retain it if possible.

June 12th, 1871, I made a trip of twelve miles to my nearest professional brother, (Dr. Garretson, of Knoxville,) told him my wishes, and he soon relieved me of the troublesome tooth, and a deal of pain, which at the time was very severe. Tissues at apex of root much inflamed and nearly ready to suppurate; posterior proximal surface badly decayed, including half the crown; apex of root slightly bifurcated; nerve entirely dead and extirpated, and periostitis in the third stage well developed, giving the whole root a dark, unhealthy appearance; foramen of the palatine not much enlarged, perfectly black, perforating the root about three lines from the apex. It looked like folly to replace so hideous a looking thing, and the Doctor said it was no use to attempt to save such a tooth, but I was determined to give it a trial; so, filling the nerve cavity with oxychloride and the crown cavity with amalgam, after scraping off the diseased periosteum and excising a couple of lines from the apex of each root, bathed

in a moderately strong solution of carbolic acid, and had it inserted, it having been out perhaps ten minutes. Extracting and replacing both quite painful. Depend on occlusion of jaws to keep tooth in its proper position.

The following notes of the case, written at the time, are taken from my case-book:

First day—Tooth very sore, but blissful relief from all pain.

Thirteenth—Tooth very sore when struck. Have to be very careful in eating and talking not to occlude jaws suddenly; uneasy sensation, but no pain except when struck; much inflamed externally.

Fourteenth and fifteenth—Increased inflammation, with dull, heavy pain at times, especially when in a reclining position; relieved by holding copious draughts of cold water in my mouth.

Sixteenth—Inflammation much abated; symptoms better in every respect.

Seventeenth—External swelling subsided and tooth comfortable, though still a little sore and somewhat loose in the socket.

July 1st—Tooth entirely well. Can masticate on it, but give it rest as much as possible, in order that it may become firm in socket, which it will, no doubt, in course of time.

In conclusion, would say that, in these days of conservative dentistry, much might and ought to be accomplished in this direction, and, from the foregoing case, infer that many teeth, heretofore considered beyond redemption, might be retained and be made to do good service; yet we have little hope that we can persuade either operator or patient to adopt the plan, even as a last resort.

W. H. Barker.

Pella, Iowa, *August* 3*d*, 1871.

Mechanical and Miscellaneous Department.

INDIANA STATE DENTAL ASSOCIATION.

The Thirteenth Annual Meeting of the Indiana State Dental Association met in the City of Fort Wayne, June 27th, 1871.

Members Present.—J. W. Ellis, P. G. C. Hunt, A. O. Rawls, J. W. Hollingeworth, Jno. F. Johnston, Merrill Wells, A. M. Moore, W. H. Gilbert, Jno. Crume, W. E. Driscoll, J. K. Jameson, W. C. Shawley, Isaac Knapp, Evan Snider, Geo. W. Loag, J. D. Brown, E. V. Burt, S. J. Kirk, C. C. Burns, Seneca B. Brown.

New Members.—Wm. L. Andrews, John Glenn, W. A. Martin, Chas. Manor, J. R. Clayton, E. H. Creditor, Burt P. McDonald.

Honorary Members.—Wm. H. Atkinson, New York; J. Taft, C. Palmer, Dr. Barkly, Ohio; Dr. Cravens, Kansas City, Mo.; Jno. L. Scott, Ohio; E. R. E. Carpenter, Illinois.

The Secretary read a paper from Dr. W. F. Morrill, of New Albany, now traveling in Brazil, on the subject of "Dentistry in Brazil;" also communications from Drs. Geo. W. Keely, of Oxford, Ohio; G. A. Mills, of Brooklyn, N. Y.; and A. T. Keightly, of Green Castle, Ind.; expressing their regrets at not being able to be present, and extending their best wishes for a pleasant gathering of the Association.

Subjects for Discussion.—1st. What are the Conditions of a Tooth which will Justify its Extraction? 2nd. Treatment of Exposed Pulps. 3rd. Filling Teeth (proximal cavities of bicuspids). 4th. Can the Decay of the Teeth be Prevented? 5th. Ethics. 6th. Treatment of Sensitive Dentine.

Dr. Jno. F. Johnston opened the discussion of the first subject by reading a very meritorious essay, in which he condemned, in unmeasured terms, that quackery so prevalent among a certain

class of dentists, who, through ignorance or cupidity, are led to indiscriminate extraction of teeth subjected to their care; he also warned against the opposite extreme, picturing the ill effects which follow the retention of diseased teeth in the mouth of a patient.

Prof. Atkinson continued the discussion. He prefers God's handiwork to man's mechanism, and insists that *all* teeth must be saved.

In the discussion of the subject of Treatment of Exposed Pulps, much interest was taken, nearly all the members participated—condemning the destruction of the nerves in the teeth. Prof. Atkinson made a strong appeal for saving all nerve pulps alive, whatever their condition of exposure, and gave in detail his manner of treatment. He substitutes in all cases glycerole of thymol where he has formerly used creosote.

Clinics.—President Stanly having appointed Profs. Moore, Taft and Atkinson to operate at the clinic on the morning of the second day, they were promptly on hand—each having his patient in the chair.

Prof. Atkinson selected a large posterior proximal cavity, complicated with the crown in an inferior molar, nerve exposed, and gave the Association the advantage of witnessing his original and superior manner of filling the same—using oval smooth fillers.

Prof. A. M. Moore selected a most difficult case: that of restoring an inferior bicuspid, the posterior half of which was entirely gone. This he accomplished in his usual masterly manner, after close application for nearly three hours.

Prof. Taft filled a complicated crown cavity. Much benefit is always derived from his clinical operations, and the interest manifested at his chair showed this to be no exception.

Most prominent among the new appliances at the clinic, was Dr. Carpenter's Pneumatic Burr Engine. And the numerous orders given for this instrument was substantial evidence of the enthusiastic reception the above piece of wonderful mechanism met with at the hands of the assembled dentists of Indiana.

The afternoon of the second day was entirely occupied on the

discussion of "Treatment of Exposed Nerves." Prof. Taft opened the discussion, pleading earnestly for more *faith* in treating these cases.

Prof. Atkinson said he congratulated himself that he heard fifty dentists in the Hoosier State discussing those deep principles of Physiology and Pathology, and thus laying solid foundations for future achievements. He had never seen, he said, so much interest manifested as was shown by the intelligent faces which had surrounded him the last two days, in the new Saving Gospel of sound teeth.

In the evening a public session was held, to which the citizens were invited. The subject, "Can the Decay of Teeth be Prevented?" was presented. Prof. Taft opened the debate, taking strong grounds in the affirmative. He traced the cause of decay in teeth to almost every physical irregularity; to careless and vicious habits, as regards health, and to neglect of proper care by the young. Every disease, even those apparently the furthest removed from apparent connections with the teeth, has a greater or less effect upon these organs. He made a very earnest plea for increased attention to children's first teeth.

Prof. Atkinson followed. He took as his text, "Live Godly, Sober and Righteous Lives," and preached a masterly discourse, setting forth vividly the great duty of redemption of the body, and thus paying due respect to our Creator.

President Stanly appointed Prof. Atkinson to conduct the morning clinics of the third day. The operation was that of removing accumulation of lime from the teeth. After removing as thoroughly as possible with instruments, aromatic elixir of vitriol was applied to dissolve any remaining particles, care being taken to protect the teeth.

Prof. Atkinson explained to the Association his treatment to restore the wasted tissues caused by these accumulations, and gave many valuable hints in regard to the very important operation of cleansing the teeth. After the clinic was concluded, the Association elected the following officers for the ensuing year:

President—P. G. C. Hunt, of Indianapolis.

1*st Vice-President*—A. O. Rawls, of Connersville.

2nd Vice-President—W. L. Andrews, of Kendallville.

Secretary—Burt P. McDonald, of Goshen.

Treasurer—Isaac Knapp, Fort Wayne.

President Stanly then delivered his retiring address, and, as his last official act, appointed Drs. Moore and Jameson to conduct the President-elect to the chair. He accepted the honor in a brief address.

President Hunt then announced that the third subject for discussion, "Filling Teeth (proximal cavities of bicuspids)" was in order. The discussion upon this subject was participated in by most of the members.

Dr. Palmer, of Warren, Ohio, concluded the discussion, giving the Association the benefit of his wonderful skill and system in filling teeth. He also exhibited fillers of his own make, which were models of beauty and perfection.

The Association then adjourned, to meet in Indianapolis the last Tuesday in June, 1872.

SENECA B. BROWN, *Secretary.*

THE AMERICAN DENTAL ASSOCIATION.

THE last session of this Association, lately held at White Sulphur Springs, was not so numerously attended as the one at Nashville last year, nor as the one at Saratoga the year before, but the number present was as great as could have reasonably been expected, when we take into consideration the location in which it was held. The White Sulphur Springs are reached by rail only by the Chesapeake and Ohio Railroad, and delegates from the West traveled nearly one thousand miles, going and returning home, more than they would have been obliged to travel if there had been direct routes of communication. All the cities of any consequence in the United States, from Boston to San Francisco, were represented, and the average of intelligence was better than at any Association which has been held

for the last five years. This was evidenced by the fact that ridiculous assumptions and absurd speculations were rebuked, and egotistical extravaganzas received no approbation in that assembly. Uniform decorum usually marked the deliberations of the Association, whilst the debates were of a more scientific character than those of former years. The time spent at the White Sulphur Springs was too short to give due consideration to all of the subjects brought before the Association, and it is probable that, ere long, the usual session of four days will have to be extended, as, under the present arrangement, many papers are necessarily passed by with far too little consideration. The session was a pleasant and profitable one, and one which will be remembered with pleasure by a great majority of those present.

J.

From The Nashville Medical Journal.

MEDICAL SECTS.

Every intelligent, honest physician knows that in this generation, there can be no honest excuse for medical men combining to organize a sect. This is emphatically an age of medical freedom — each practitioner of the art having conceded to him the unquestioned right to treat any given case submitted to him, in his own way. He may even find space in the current medical journals for the publication of a practice, in a given class of diseases, which may differ, in every essential, from any practice ever taught in a medical school, as it is possible for one thing to differ from another, and yet be in full and honorable membership with physicians generally. We remember a fellow-graduate, who had listened with great patience to Drake, but who abandoned his precepts in the first year of his practice, and Drake permitted him to publish in his (Drake's) own journal, the fact that *he had found* Drake's practice, in fever, unsuccessful, and that now he relied upon *sugar of lead* to cure all sorts of fevers! What greater latitude can an honest man want than this? What greater liberality could a great teacher and journalist show than

Drake showed him? And what greater liberality and tolerance could his professional brethren exhibit than those who continued him in full fellowship? And if he could cure fevers with sugar of lead, who would care? and if he failed, who would care? The best curer, in the long run, would have the best practice.

But suppose this sugar-of-lead man had published, not honestly, in a medical journal, as he did, but in a newspaper, that he "had found" himself in advance of all the cultivators of medicine, from the beginning until then, and therefore announced the dogma that sugar of lead, in proper doses and at proper intervals, farther dulcified with maple sugar, would cure anything, and that he would give dose and interval, upon application to him, for any disease, is there an honest medical man in all the land who would have tolerated him? Certainly not. This abandonment of him he would call persecution, and his abandonment of honesty they would call roguery, and the dear people would think it a family quarrel—only.

There is no arguing this thing with the people, but every physician, honest or dishonest, regular, irregular, or defective, understands it thoroughly, and as one class organize to overthrow the moral law that makes medicine a profession to be ranked with law and divinity, another class will be pretty certain, in obedience to that law, and to the instinct inherent in the consciences of a great majority of mankind to transmit to their posterity, without injury what they have received from their ancestors, to circumvallate themselves with an impregnable wall against disorganizers, innovators and adventurers.

The legitimate medical platform is large enough for the doctors of every name and country under heaven, being as broad as the earth and roofed in by the sky; and if this area has not verge and room enough for some unconscionable medical cormorant, panoplied in ignorance and pretension, he gets but sheer justice when the fraternity order his spurs to be hacked off with a butcher's cleaver, and himself ignominiously thrashed out of camp with a bull's pizzle.

Bayne employs a great deal of fine writing to prove that when the island emerges from the sea and clothes itself in verdure,

and invites occupation and ownership, we feel that the insects which worked their lives away in laying its imperishable foundation toiled not, neither did they die in vain; and that whatever is made is of use, but it is hard to understand the use of an Ishmaelite offering battle to all mankind for the sake of battle.

A split in a church is the most natural thing in the world. Some member gets a new light, and dozens of others light their torches at it, and dancing in and out, and around and about, remind one of Coleridge's "Mariner:"

> "The upper air is burnt into life!
> And a hundred fire-flags sheen;
> To and fro they were hurried about!
> And to and fro, and in and out,
> The wan stars danced between."

But they all agreed in the Law and the Prophets, and inexorable sin and indispensable atonement. A split never occurred because one party contended that there was no need of atonement, or that the sin of the world had been taken away except upon conditions.

When medical men could talk all day about the Anima of Stahl, the Archeous of Van Helmont, and the Vis Medicatrix of Cullen, and whose medical star-gazing becoming a chronic habit, disabled them from turning their eyes inward upon themselves, long enough to inquire, How are you, and what are you about this fine morning? Look! the sun of reason, with its rosy fingers, is gathering dew-drops from the lawn, and the fire-flies of the azure have paled into nothingness. Look out at the source of light, and then estimate how much you have assimilated.

Where are your system-makers? Are enthusiastic young men now going about over the world seeking to be imbued with this or that man's notions? Not at all; they are stationary, plumbing the depths of science. When they come up to the surface, they will be on no one's back, but, made light by science for the race that is set before them, science-toned, they are thinking, of necessity, and therefore not hucksters of the thoughts of others.

We have been thinking of those bright old dreams, and how,

in old times, they could fit their yokes to the accommodating necks of master-seekers, and how, even in this washed generation, a few delight to skulk back to the mire of vassalage.

A singular feature in the reformation was that, for a long time, leaders would do the very same things they publicly condemned. The new religion could not escape from the body of the old. The cask was emptied, but the bung revealed its former contents. "There was new life in the world, but it had not yet created a new body." So with medicine. At last its votaries, free from the dogmas of speculating, self-constituted masters, when leaders were so alone from science, and names were nothing but the ghost of dead things; when the "spasm" of Cullen lay entombed with him, and the "active dilatation" of Kattlebrunner was inactive as death, and the gifted Brown had given his constitution and his life for followers, dead set against "spasm" and boisterous on indirect debility, excitement and excitability — all covered up, doctrines and their inventors, by the remorseless and inexorable plow of progress, then, when the good and the peaceable might reasonably hope for quiet, unfettered, yet we see medical Israelites on the Canaan side of the Dead Sea, sighing for the chains and flesh-pots on the distant shore, and proposing again to burn brick without drift or stubble. They sing of men and dogmas, of the Pharaohs, and of the golden calf. And slave-seekers, with their dogmas, or "something to work to," form in squads, and weary the ear with their clamors.

God forgive us if we have not the patience which our blessed religion inculcates for these disturbers of the peace. Great men are said "almost to attain the serene and all-embracing tolerance of contradicting no one," — a consummation devoutly to be wished; and men not great might profit by their example.

Some time ago, when Commissioner Van Aernam, of the Pension Bureau, entered upon the duties of his office, he found thirteen hundred and fifty surgeons on the roll. These, according to their own written statements, were classified as follows: 1st, Doctors; 2d, Eclectics; 3d, Thomsonians; 4th, Indian Doctors; 5th, Herbalists; 6th, Hydropaths; 7th, Homœopaths; 8th, Abortionists. The Hobgoblinpaths and the Rawgumroots were

not represented, from some unaccountable cause. Commissioner Van Aernam had trouble with this medical Mosaic, and with the example of Sancho Panza before him, who, while acting as judge, was annoyed by counsel upon both sides of a case, and resolved upon hearing one side only—a revolution in jurisprudence that relieved his brain from a world of law mathematics,—resolved upon storing away, in the drawers of his Bureau, one sort of doctors only. In his blanks sent out to his pension boards of examiners, this, among other questions, is to be asked: "Under what system of medicine do you practice?" The Commissioner then enumerates the "systems of practice" that would chiefly furnish applicants, and he says the above question can be answered in one word thus: "Allopathy," "Homœopathy." "Hydropathy," "Eclectic," etc., etc. Whether he intended excluding physicians in fact by not mentioning them in name, does not appear. But it seems that homœopaths were excluded, and the effect was quite zymotic. They were very considerably exercised. They have successively undergone effervescence, concoction, and dispumation. Not belonging to eclecticism, or any of the pathy family, but a poor M. D., only, without prefix or addendum, we can afford without the slightest bias or prejudice, to look upon this tempest in a teapot. They have petitioned the President of the United States, and the Secretary of the Interior, to remove Van Aernam for removing them.

At a late meeting of the Medical Society of the District of Columbia, Dr. Toner, President, a committee was appointed to "enquire into and report upon the facts connected with the exclusion of irregular practitioners from the position of Examining Surgeons in the Pension Bureau." From the report of this committee, now in pamphlet form before me, it appears that, notwithstanding the floundering of Van Aernam, Commissioner, among the pathies, he finally resolved to confide alone in legitimate physicians. If legally qualified irregulars challenge the term "legitimate," we will modify it to mean members of the American Medical Association, or State or County Societies, and other organizations entitled to representation in that Congress. This is a righteous decision. If St. Paul had made himself more or

less than Paul the Apostle, we doubt if the other apostles would have recognized him. Luke, the physician, we read. If Paul placed a prefix to the revered name, it is a coinage of his own appreciative heart — the *beloved* physician — and not any title claimed by Luke, indicating that he was of a medical sect only. Just think! Luke, clairvoyant physician; Sydenham, homœopathic physician; Rush, eclectic surgeon and cancer curer; Drake, hobgoblin physician and negropathist; Dr. Stubbs, Indian Doctor.

Indian Doctor! When Dr. Rush long ago showed, and Schoolcraft, after living thirty years among them, and having culminated in his great work, under the authority of Congress, of six royal quarto volumes, of more than three thousand pages, declares that their only treatment for diseases is to guess at the animal that has gone into the sick one, make an image of it, and shoot the image. This is their great remedy. But they first try to get the animal — their pathology for all diseases — out of the patient, by shaking pebbles in a gourd over him. They have knowledge of only a single medical plant — one that pukes and purges; but their reliance is not upon it, but upon rattling the gourd and shooting the image. In very rare cases they go into a sweat house. And yet mountebanks, all over the land, pretend to cure disease with herbs and roots, a knowledge of which has been derived from the Indians.

If spiritualistics, clairvoyants, homœopathists, hydropathists, herbalists, abortionists, eclectics, electricians, and hobgoblinists, can do such mighty things in disease, what is the use of their fussing so much about it? If they will do the things, and leave out the fuss, the same great object would be attained, and a large quantity of unpolluted wind left for breathing purposes. But it is the wind that brings bread, not cures. Irregular, if you are my brother, claim no other parentage or inheritance than mine. As the raw recruits under Jackson at New Orleans, in the December night fight, dared the British to "come out from their holes and fight like men," so we say, come out. We do not care what you believe or what you do not believe — what you give, or what you do not give; or how you prepare it, or how you give it;

only come out from your pathy ambuscades, and fight disease like men, not like skulking varmints; and the medical hosts will hail you as brethren. What do heroic men in the army service want with such as these?

Commissioner Van Aernam has taken a sensible view of it, and confined himself, in the medical service, to doctors only — for whoever, in medicine, pretends to more than doctors do, by unusual prefixes and addenda to his name, proves that he knows less, and that there is no medical manhood in him. We are bound, by common sense and our ethics, not to know him, and whatever physician yields to any force of circumstances, and visits the sick with such, should be reported by his neighboring physicians to the nearest Medical Society, whose Chairman, upon sufficient proof, should publicly read him out of the profession, and order the Secretary to publish the fact in the nearest newspaper. Let a physician, importuned and threatened by village magnates do this thing, remember that the profession of medicine has made him a custodian of its honor; that this, sink or swim, live or die, survive or perish, must be preserved; that he must

"Resolutely keep its laws,
Uncaring consequences."

JOURNALISTIC.

The Dental Times for July has several articles upon replanting teeth, the first by L. D. Walker, D. D. S., which we should not particularly have noticed, were it not for a statement made in his introduction to the report of the case, which is as follows: "The idea of replanting natural teeth is ridiculed by the majority of the profession." We would simply suggest, that if the Dr. had been in the habit of attending the Dental Associations and had read and understood the dental literature of the day, he would hardly have made such a declaration as the one quoted above; but the next article, by Prof. Barker, upon the same subject, is full of interest, as it has to do with replantations in

case of disease at the apex of the fangs, and especially in cases of abscess, which seem to defy ordinary means of cure. This practice was first brought to the notice of the profession by Mr. Coleman, of London, who read a paper upon the subject before the Odontological Society of Great Britain. We called the attention of the profession to this subject in the MISSOURI JOURNAL at that time, and we have now an article bearing directly upon this subject, from one who has given the practice a fair trial in a single case, which article appears in the present number of the JOURNAL. Prof. Barker's experiments are also corroborative of the views of Mr. Coleman. In a good many of the cases recorded, the tooth was extracted, the periosteum scraped off where it had thickened near the apex, and the fang filled before it was returned to the socket. Generally the root has been bathed in a solution of carbolic acid, and the socket washed out with a similar solution. This is probably good practice, but some successful cases, where carbolic acid was not used, demonstrate that this is not a *sine qua non* in the operation. Prof. Barker has now operated upon his fourth case, and thus far with uniform success—and in three cases, at least, upon molar teeth. We expect to hear soon of many more efforts in this direction. From the *Times* we also learn that John Smith has been appointed Surgeon Dentist to Her Majesty in Scotland. *John Smith* is well known to most of our readers, and we have no doubt but that John will be pronounced, by the majority of his acquaintances, as just the man for the place. Success to John Smith!

The Buffalo Medical and Surgical Journal for July contains one of the characteristic articles of Z. C. McElroy, M. D., of Zanesville, Ohio, in which he maintains that the function of the lymphatic system has been almost entirely misapprehended by writers upon physiology. With a considerable amount of reading, and a ready use of language, much of which is smooth, measured, and euphonious, one might at first be led to suppose that he had really made some important *investigations* touching the subject, that would lead a logical mind to coincide with him

in his conclusions; but a closer scrutiny of his article will show most conclusively that his *investigations*, as he is pleased to call them, are simply baseless assumptions, which have been conjured up by a fertile imagination. We confess that the phantom has taken a rather unique form. His conclusions are mainly "that the *molecular forms* of structure of the human body, in the act of momentary disintegration and performance of allotted function, store up, in one or more of the chemical compounds then formed, the force necessary for their own reproduction and perpetuation as well as general and special physical contours.

"That the lymphatic system is the special means for the collection of the material in which the force for the preservation and perpetuation of the human body, as well in minutest detail as in aggregate, is stored up; adding it to the blood-stream to accompany new material from the stomach and intestinal track to the lungs, to be subjected to the change brought about by the gases of the atmosphere; and to combine the material and force to form arterial blood, so that when returned to the left heart and from thence distributed to the seats of molecular repair and disintegration, these processes may proceed without interruption or delay, either of which occurring, life and function would soon be impaired or wholly arrested.

"That the force stored up in the contents of the thoracic ducts is identical with that which is now known as the vital force or forces of the human body."

The L'Art Dentairé, the only dental journal which France produces, and which has been suspended for several months past, has again made its appearance among our exchanges. We learn by the number before us that Monsieur Preterre, the proprietor and editor of the journal, made himself generally useful during the war, having offered his services gratuitously to the Minister of War for treating fractures of the jaws and deformities caused by wounds of the face. His services were accepted by Blondeau, Minister of War *ad interim*, and he promises us a report of the most interesting of his operations in the next number. The articles found in this journal are usually scientific in their character,

many of them selections from the current medical journals in France, and we must admit that the selections, for the most part, are well made. We must, however, keep the title of the journal well in mind, or we might forget, while reading it, that it was dedicated to the dental branch of the profession, though we should never fail to observe that Monsieur Preterre and his operations are kept constantly before the eyes of the reader.

In the present number we have a report of a case of caries of the upper jaw, cured by injections of tinc. of iodine continued for several weeks. The case is reported by a Dr. M. Reynaud, of Trebizonde, in Turkey in Asia. Dr. Cousturier also reports a case of necrosis, and consequent loss of the lower maxillary bone, and its spontaneous reproduction in a period of thirty-five years. We are glad to see *L'Art Dentairé* again among our exchanges, but we would like to see something about dentistry occasionally in its pages.

Article first in the *American Journal of Dental Science*, for June, is under the head of "Bone Fibres," and by George B. Harriman, M. D., D. D. S., Professor of Microscopic Anatomy, Boston Dental College. The author of this, has, however, read "Virchow's Cellular Pathology." He says, "sections of bone were ground down thin, the vessels gradually becoming invisible, and the cavities containing these vessels were termed medullary canals. The error of this theory is evident from the fact that these narrow spaces contain no marrow."

Virchow says, "As in the sections which are obtained by grinding down bone, the vessels themselves cannot, for the most part, any longer be distinguished; the cavities in which they run have been named medullary canals, improperly, inasmuch as there is usually no marrow in these channels."

The author says, "Bone corpuscles and their processes bone canals (canaliculi ossi), were common terms." Virchow says, "They used to be called bone corpuscles and their processes bone canals (canaliculi ossei).

Again our *author* has, "At another period it was supposed that they contained a deposit of calcareous matter, * * * * *

thus giving rise to another term *canaliculi chalicophoro.*" Virchow says, "and as the view was originally entertained that the calcareous matter was really deposited in them * * * * * the canals were also termed *canaliculi chalicophori.*"

Again the author says, "Within these corpuscles or bodies a nucleus may be distinguished in which are cellular elements of stellate form." Virchow says, "Besides, a nucleus may be distinguished within these bodies, and * * * * we discover that here, too, we have once more to deal with cellular elements of a stellate form."

The text had been pretty closely followed up to this point, but not clearly understanding Virchow, at this place he has made the very *slight* mistake of finding *stellate cells* in a *nucleus*, when Virchow found a nucleus in a stellate cell. This *original writer* and experimenter has been led to the conclusion that bone is composed of fibres and calcareous salts. We do not think the diction of the article much improved by the slight changes introduced by this *author*, and then if Virchow had been followed verbatim *all* the way through, up to the place where it was necessary to introduce his "conclusion" upon the structure of bone, that little mistake would not have appeared to mar its beauty. But farewell to Haversian canals, lacunæ and canaliculi.

An exceedingly well written article appears next by Geo. H. Cushing, upon "Conservative Dentistry," which it would be useless for us to attempt to compress into a short space, so as to be able to introduce it in this sketch, of what is new and valuable, or what claims to be such in the literature of the profession.

Among the selected articles is one from the *Times*, by S. P. Cutler, M. D., D. D. S., upon the "Minute Structure of an Amalgam filled Tooth." The historical and descriptive parts of this are interesting, and the theoretical dissertation connected therewith, are candid expressions of opinions freed from that offensive dogmatism which too often characterizes theoretical productions.

The Cosmos for July presents some articles of interest which we proceed to notice. The first is a conclusion of one, of which

we have spoken before, and although presenting some facts which may be useful to the profession, would be of much greater value if freed from many almost ridiculous features which should never be found in practical dissertations. The connection between neuralgia and diseases of the teeth, has been overlooked very generally by the medical practitioner, but the attention of the dental profession has been called to this subject again and again, through the journals, and nearly every practitioner of experience can narrate cases of neuralgia cured by extraction of teeth, roots, etc.

"The Perkins-Hyatt (celluloid) Base," by Geo. L. Rouch, touches a subject that will interest a large class of practitioners. It is recommended by the author for making attachment of teeth to swedged aluminum plates, instead of using rubber. It can also be used for mending rubber plates, one great advantage being that it does not injure the plate by vulcanizing, and it can be done in much less time than it takes to vulcanize a plate. We are using plates of this base for regulating, and find it much more easily constructed than rubber, and I think preferable in every respect. We are not yet satisfied that it will altogether supersede the use of rubber, but it will be found extremely useful in many places.

Another article by Preterre Brothers, upon the same subject, recommends this base highly as a substitute for rubber in all cases. It is not patented, at least no claims are set up for *royalty* by the inventor. It is given to the profession in the true spirit, and we hope it will prove to be all that is claimed for it. The method of working it has already appeared in this journal.

An editorial, by Dr. McQuillen, protests against the injustice done to the memory of Horace Wells, by constantly attempting to steal the glory which justly belongs to him, as the discoverer of the anæsthetic powers of nitrous oxide gas, and the demonstration of its usefulness in surgical operations. We have alluded to this subject more than once before, and we intend upon all proper occasions in the future to defend the memory of this man, who has conferred this great boon upon the human race, and we

insist that the world shall acknowledge its indebtedness to him, even if it be beyond its power to cancel the debt.

Let Morton, Jackson and Simpson receive all the honor due them for their connection with the introduction of anæsthetics into general use, but let it be forever settled that Horace Wells first used an anæsthetic in surgical operations, and gave the results of his experience to the world.

The Dental Cosmos for August has for its leading article an editorial upon "Arsenical Applications," in which the author, Dr. McQuillen, gives some well-timed advice in reference to the use of that powerful and dangerous agent, "arsenic."

The amount of damage done by this agent, in the hands of careless manipulators, is by no means appreciated. He recommends the use of very small quantities, when it is used at all, for the purpose of destroying pulps in teeth; thinks twenty-four hours long enough to let it remain in the cavity, but states that "Prof. J. Foster Flagg advocates leaving it in for a week or more."

We believe even a much shorter time than Dr. McQuillen speaks of will suffice in nearly all cases. We have seldom left the paste in a tooth longer than three hours, and can see no good reason for leaving it in longer, if the pulp is well exposed. Still, no particular danger may generally be apprehended by leaving it in longer, if perfectly secured. We are satisfied that where arsenic is applied to the pulp, the latter will have become totally unfitted to perform the function of absorption long before the three hours will have expired, and the quicker it is removed, after it has done its work, the better, as the risk of its escape from the cavity and consequent deadly action upon the soft tissues, and even the bones, will be correspondingly lessened. It does not follow, as a matter of course, that, if the arsenic has done all of its work in three hours, the pulp should be immediately extirpated when the arsenic is removed. It is sometimes better to delay two or three days before that operation is performed. The Doctor's direction to use "finest and best brooches," in extirpating the nerves, should be borne constantly

in mind, as the use of too large brooches, and a neglect in having them well annealed, has caused the loss of many valuable teeth.

Next we have record of a case of secondary hemorrhage, by B. A. Rodrigues, M. D., D. D. S., of Charleston, S. C.

A lateral and central incisor were extracted, and secondary hemorrhage supervened upon the second day.

The alveolus was plugged with cotton, saturated with alum, and subsequently, upon a return of the bleeding, with persulphate of iron; which failing, the alveolus was carefully cleared out and solid nitrate of silver carried up to the bleeding vessel, and the hemorrhage was controlled.

We are of the opinion, that when bleeding after the extraction of a tooth takes place, from the alveolus itself, that it matters but little whether any astringent is used or not, as it can always be controlled by plugging the alveolar cavity. It requires but little pressure upon a bleeding artery, of the size of the dental arteries, to compress them, and a plug carried carefully up as far as the apex of the tooth reached, and pressed to the very bottom of the cavity, then kept there by filling the rest of the alveolus, and then pressed down by placing a small roller bandage over it, and closing the teeth upon it, or keeping up the pressure upon it in any other way, will always stop a hemorrhage in this location, whether the cotton used for this purpose be wet with an astringent solution or not. Where failures have occurred in accomplishing this result, either too large a pledget of cotton has been used at first, so that the vessel has not been compressed, or a sufficient compress has not been placed over the whole plug with the requisite pressure to keep it in place. No principle is better established than that pressure will effectually stop bleeding from a blood-vessel, and that the resulting inflammation in such cases as these will effectually seal up the vessels themselves.

Dr. Fitch, on "The New Theory in Dental Histology," comes next, in this number of the *Cosmos*, in which he handles Dr. Cutler's tailless dogs and cats without gloves. We do not think a dentist should handle such things *bare handed.*

Dr. Forster recommends fine white marble-dust for moulding-sand, used in the same way as other sand for this purpose.

The American Journal of Dental Science, for August, publishes an article written by A. P. Stevens, D. D. S., and which was read before the Merrimac Valley Dental Association, upon "Charlatans, Empirics, or Dentistry as a Learned Profession," in the course of which it is stated that the whole number of graduates of all the dental colleges amounts to only 1,673. Of these, it is not probable that more than 1,200 are alive; and, taking into consideration that some have engaged in other pursuits and many have located in foreign countries, not more than 1,000 graduates are now practicing in the United States. The proportion, then, of graduates to the whole number of practitioners, is one to twelve or one to fourteen. The Dr. asks, "Is this anything to be proud of? Is this making Dentistry the peer of Medicine?" * * * "True dentists of 1870 owe it to themselves and their profession, that their title of doctor has been well earned and is legitimate." * * * "I do not advocate dental collegiate education, because I think if this be once accomplished all will have been done. By no means. This is but the beginning, and its greatest value will ever be in its moral effect and the power it has to sharpen vision to hitherto unknown defects, and in opening unthought-of fields for future occupation.

"That man is barren of manhood's true ambition who can put away a busy practice for months, and betake himself to the routine of lecture and study, without coming from the scene of his labor and triumph with brain and hand stimulated to higher and better efforts.

"Here should be the beginning of reform. Already hundreds of earnest, thoughtful men have directed their footsteps towards the Mecca of their hopes—dental schools—beacon-lights of our profession stamping themselves, by the act, as friends of education and advancement; and where hundreds have gone thousands are wanted."

Dr. H. E. Robinson, in an article upon extracting teeth dur-

ing pregnancy, concludes that "Where no other remedy is possible, extraction is better than prolonged pain." We have no doubt but that, in many cases, teeth may be extracted during pregnancy with perfect impunity; but in nervous individuals, who greatly fear the operation, it should be avoided if possible, as in some cases any severe shock to the nervous system suffices to bring on a miscarriage or a premature labor.

In the *Boston Medical and Surgical Journal* is a report of the Massachusetts Medical Society, and an address by Dr. Henry J. Bigelow, in the course of which he intimates that the actions of the American Medical Association do not entirely receive his sanction and approval, and spends considerable breath in making it apparent that the Association has no power to direct medical societies or medical schools. We presume every member of that society was as well aware of that fact as Dr. Bigelow himself, and probably every one of them might have added that the American Medical Association has the power to deny representation to any society or school which does not see fit to conform to its rules and regulations, and that is all the controlling power, so far as we are informed, that it has ever proposed to exercise.

In the number of this Journal, dated the 29th of June, a Dr. P. A. O'Connel, of *Boston*, relates a case of probable poisoning from wearing a red rubber plate in the mouth. He naively and innocently commences his article as follows:

"My attention has been called to a case which points to the possibility of the occurrence of *salivation*, and the *constitutional effects of mercury* from the use of artificial teeth; and the importance of the circumstance has seemed to be sufficient to justify a mention of it; so that inferences may become either corrected or confirmed by the observations of others of the profession."

At the close of the article he asks: "Are artificial teeth, under any circumstances, capable of producing salivation?"

We would suggest that although porcelain *teeth* probably do not produce salivation "under any circumstances," it may be possible that a plate constructed of rubber and mercury will produce

that effect. We presume that every reader of the MISSOURI JOURNAL has seen this and its cognate questions fully discussed in the Journals, and we only give place to it here that our readers may become aware of the little attention given by physicians to the diseases of the mouth.

The Pacific Medical and Surgical Journal for August has an article by Dr. J. F. Montgomery upon "The Ethics of the Medical Profession," which contains some precepts which must commend themselves to all honest members of the profession. We only quote, for the thoughtful consideration of our readers, the following: "The arts of the shopkeeper or the charlatan to acquire pelf should be despised and spurned, and any who could be so base as to resort to means so degrading should find neither favor nor recognition with honorable members.

"No one should seek or desire an advantage of another, but, on the contrary, he should scorn to profit by any injustice done his fellow by the public." In our daily life-work, both as regards our patients and our fellow-practitioners, let us remember and practice the precepts of the golden rule.

In a short article in the same journal, headed "Cundurango," we have the following: "One of our exchanges records several cures (of cancer) by cundurango, and a foot-note attached to one of the reports reads thus, in small type: 'This case has since died.'"

We once knew an eclectic doctor who cured a bad case of consumption, but the patient died of *diarrhœa* a day or two after the doctor had declared the consumption cured.

The Medical Record of the 15th of August has the following brilliant report of the last meeting of the American Dental Association:

"The American Dental Association held its annual meeting, August 3d, at White Sulphur Springs. Dr. Harriman, of Boston, read a paper on the formation of teeth, showing them to be fibrous. The views expressed caused some surprise and considerable comment, being regarded as a bold departure from old

established theories. A discussion then followed on Dental Histology, and was participated in by Drs. Atkinson, Judd, McQuillen, Harriman, and Walker. The report on Dental Therapeutics was followed by a paper on the same subject by Dr. Bogue, and a discussion by Drs. Taft, Judd, and Atkinson. A paper on Anæsthesia was read by Dr. Dickerman."

We think the "item" was furnished by some "lame duck," who had been plucked of his most brilliant plumage in the gladiatorial conflicts of the Association.

The Boston Medical and Surgical Journal, of August 17th, has an article upon "Cundurango," by which it appears that stock in this new curative agent is already below par, and we are admonished that cancers will probably continue to afflict mankind for an indefinite period of time yet to come. Quacks will still flourish, and imposters still pocket enormous fees for curing simple tumors and for promising to cure malignant ones, and credulous people will still continue to be fleeced as of yore.

Dr. G. W. Arnett cures neuralgia with the citrate of caffein, sulphate of morphia, and citric acid—three grains each of the two latter, to one-half grain of the former.

BIBLIOGRAPHICAL.

"New Remedies, a Quarterly Retrospect of Therapeutics, Pharmacy and Allied Subjects," edited by Horatio C. Wood, jr., M. D., is before us. The number contains eighty-four pages of well written matter, touching upon these points, and will prove, we opine, a valuable addition to the medical literature of the day. It is published at $2.00 per annum, in advance.

The "Medical Cosmos" is a monthly abstract, published by Geo. J. Ziegler, of Philadelphia, containing sixteen pages, at $1.00 per year. The first and second numbers are already issued, and gives us abundance of evidence that the "Medical Cosmos" will be worthy of patronage.

"Taking Impressions of the Mouth," by James W. White. We have received a book of the above title from the Publisher, which gives, in a plain, practical manner, a description of materials used, and methods of using them, in taking impressions of the mouth. From the examination given it, we should think that it gave a very good description of the most improved methods of taking impressions. Appended to this is a chapter taken from "Harris' Principles and Practice of Dental Surgery," last edition, "On Porcelain Teeth," which is of interest to the dental student.

MICHIGAN STATE DENTAL ASSOCIATION.

The Seventeenth Annual Meeting of the Michigan Dental Association will be held in Grand Rapids, commencing at one o'clock, Tuesday, October 10, 1871. The following members were appointed to prepare reports. The first-named upon each committee is chairman of the same, and of him a written report will be expected. Other members of the committee will be expected to participate in the presentation of the subject assigned them:

Anatomy—J. A. Watling, W. Owen, G. W. Cummings.

Physiology—G. E. Corbin, M. S. Knapp, J. W. Clawson.

Chemistry—J. A. Robinson, W. D. Templer, E. G. Douglass.

Hygiene—C. B. Porter, H. H. Jackson, W. H. Dorrence.

Pathology—G. W. Stone, J. W. Storm, E. Hunter.

Therapeutics—J. Douglass, H. Benedict, R. S. Bancroft.

Surgery—G. W. Field, W. H. Jackson, E. G. Miles.

Dental Education—G. R. Thomas, H. K. Lathrop, W. R. Cutler.

All members of the Profession are cordially invited to be present. Every progressive dentist will feel it a duty and a privilege to spend a few days in the investigation of these subjects, and the discussion of other matters of general interest to the practitioner.

E. S. Holmes, Pres't.

Geo. P. Holmes, Secretary.

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] OCTOBER, 1871. [No. 10.

From The Pharmacist.

ON FERMENTATION.

By Professor A. W. WILLIAMSON, F. R. S. Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 331.)

I stated that exposure to a red heat was found by Pasteur to act effectually in destroying the vitality of these little particles, and in every case in which he used air which had been subjected to that heat, he found that the air was incapable of showing any of these organisms in liquids even the most favorable to them. There was, however, still one remarkable exception, which was presented by the experiment of Gay-Lussac, to which I alluded some time ago. He found that when he used a mercury trough, which he selected as giving him the best condition for the purpose, he got these little cells produced from the air which had been calcined. Now, Pasteur found that mercury exposed to the air, as it is in these operations, has adhering to it a number of those little germs, and that when no more than the ordinary precautions are taken for cleansing the mercury, it has with it a considerable variety of such little organisms, which, if placed in a suitable material, develop themselves and grow quite well. He proved this in various ways. For instance, some of the little bulbs

which had been sealed up whilst full of fermentable liquor and steam, and which had been kept for some time in a warm chamber, so as to be certainly free from vital organisms, were opened under mercury, so as to allow the ends of the tubes to be filled with mercury. He then lifted it up, so that nothing came into contact with the liquid but mercury, and passed into them sometimes air which had been passed through a red hot platinum tube, and sometimes oxygen gas given off from melten chlorate, where certainly there would be nothing of organic life present, and in almost all those cases he found that organisms developed themselves. He attributed this entirely to the mercury, because when that was absent the result was the opposite. In order to prove this point more decisively, he took a liquid which was capable of decomposing, kept it for some time in a quiescent state, and then allowed a drop of mercury, in the state in which he had been using it before, to flow into it, and put the mixture into his warm chamber. He soon found that the mercury had carried in the germs of these organisms, and that they developed themselves quite well in it. Certainly any one unaccustomed to such accurate precautions could hardly have anticipated such a result as that, and a result which is, I think, most instructive, as showing what extraordinary precautions are needed, in order to prevent the entrance of these excessively small particles into the materials which we are working with. Side by side with this, I must mention another result of Pasteur's, for it was, perhaps, hardly less startling, and that was, that when, instead of taking the liquid which I mentioned to you just now, yeast water and sugar, he took common cow's milk, or, at all events, the mixture which is sold by that name, and boiled it, with a view of destroying any organisms that might be in it, and then he sealed up the bulbs while still full of steam, so that no air could get into it, and when he kept such sealed-up bulbs for some time in a warm chamber, he found clear evidences of decomposition; he found a turbidity in the substance, a curdling of the nitrogenized materials of the milk; and on taking out some of it, he found it was swarming with little animalcules; and yet he had boiled the milk for a considerable time and had closed the vessel whilst the ebullition

was still going on, so that no air could have carried the germs into it before it was closed. Still, there were the little organisms unmistakably present. He then modified his experiment in this manner. He boiled his milk at a higher temperature. I need hardly tell you how that can be done. You are, of course, aware that the temperatures at which water, or milk, or any liquid boils, are different, according to the pressure which the air exerts upon it; that is to say, if you were to boil water here, and then if you were to carry it to the top of St. Paul's, and notice the temperature in each case, you would find that at the greater height it would boil at a lower temperature. If, in like manner, you carried it down to the bottom of a deep mine, and boiled it there, you would find the temperature would be higher; the greater the pressure of the superincumbent air, the higher the temperature at which any liquid boils. Pasteur wanted to make his milk boil at a higher temperature, and for that purpose he resorted to a very simple device. He had a long tube attached to the vessel in which his milk was boiling, bent over at the top, and brought down into a glass jar containing mercury to the depth of fifteen inches or more. Of course, under these circumstances, the steam which was being formed in the vessel, has to force its way up against the pressure of this mercury; the pressure of these fifteen inches of mercury were added to the pressure of air, and a total pressure was obtained, about half as much again as the pressure of the atmosphere amounted to. Of course, the milk had to boil at a higher temperature, corresponding to this higher pressure; and what did he find then? He proceeded, as before, with the experiment, closing the vessel while it was boiling, and not letting any air into it. He then kept it, and he found that no organisms appeared, even on keeping it a very long time; and he was, therefore, led to conclude that the milk must have contained in it some germs which could withstand the temperature at which the milk was boiling at first, but the vitality of which was destroyed by exposure to the higher temperature to which he exposed it in the subsequent experiment. He had reason for that, for other experiments had been made by himself, and by various other philosophers, which proved that many species of organisms can

withstand a very high temperature without losing their vitality. In that respect, there are great differences amongst these little organisms which are remarkable and interesting, and will, no doubt, be of value to future investigations. To give you an idea of the great variety presented by them in their power of withstanding heat, I may mention that if I were to heat the contents of this carboy, in which the alcoholic fermentation is going on, to 60° Centigrade (100° being boiling point Centigrade), which is rather more than half, the fermentation would be completely arrested, and the yeast-cells would be killed. On the other hand, the particles in milk are capable of withstanding 100°. Pasteur connected that fact with the circumstance that milk is alkaline, whilst this liquid is acid, and, as a rule, acid liquids destroy the vitality of these organisms at a lower temperature than alkaline liquids. That is not all. There are in the particles themselves great differences in their power of withstanding heat. Amongst the experiments which are particularly remarkable in that point of view, I ought to mention some with regard to the little spores of mould, and such like things; for instance, the *penicillium glaucum*, and some others. M. Pasteur collected some of these; and after taking a little piece of asbestos, or mineral flax, as it is sometimes called, and heating it in a flame, so as to destroy anything adhering to it, he put it carefully into a vessel in which some of this mould was growing, and moved it about, so that a number of particles of the seed of the mould might adhere to it. He then heated the asbestos thus coated with dust to 120° C., a higher temperature than that to which the milk had been exposed; but after putting it into a liquid capable of feeding mould, he found that the mould made its appearance in considerable quantity, so that the germs of that particular organism were not destroyed by 120° of temperature. He even went higher, as far as 125°, and found that that was not enough, but a little over 125° killed them; 130° they cannot stand, so that, according to these observations, the limit appears to be between 125° and 130°.

In all the cases of which I have been speaking, the ferments (because all these organisms are in their nature and functions analogous to the common ferments) were removed from the sub-

stances which were employed before the air and such like materials carrying the germs, were brought in contact with them.

With regard to processes for arresting fermentations and decomposition in liquids in which they are taking place, a number of observations have been made which are of considerable practical as well as theoretical importance, in relation to the results which I have been stating. Of course mere heating, carried to a sufficient intensity, will arrest any process of fermentation or putrefaction which may be going on in a substance, and the applications of that process are, of course, exceedingly numerous and important. The only thing is, that we do not know, and it would be most hazardous to suppose that, in any particular case, we can name beforehand the temperature requisite to destroy a particular organism. If any observer were to say that he has exposed a mixture to 100°, and, therefore, the organism must be destroyed, experience would refute him; if he said he had exposed it to 110°, or even 120°, experience again would refute him; but if he had exposed it to 150°, and asserted that he must have destroyed them, it is quite possible that experience might show that there are organisms which will resist even that temperature. It would have been almost impossible, some time ago, to admit, and we could not have admitted, that these organisms would have withstood the temperature which they have been found to withstand; and, therefore, what temperature is sufficient to destroy the organism in any case must be found by experiment, and that alone. Amongst other conditions for arresting the process of decomposition or putrefaction, which are in their nature like those of fermentation, I ought to mention the process of drying. All the processes of fermentation which I have been speaking of, and all others, which I could tell you of, are accompanied by moisture. Moisture is present, and is essential to them; in fact, these little organisms are exceedingly soft, wet things; moisture constitutes a great part of their substance, and in a dry medium they cannot live, or if the substance were dried, they would be destroyed by it. Applications, therefore, of a mere drying process, are amongst the most important and interesting of this class of agencies. Many of them are well known. For instance, the ordinary

process of preserving fruit by means of drying it. Germs of putrefaction or decomposition may be present in the fruit; but if you merely take away the greater part of the moisture, you render the substance incapable of decomposing. Among the agents which serve for that purpose, there are some which abstract the water, not in a state of vapor, but in the liquid state; for instance, common salt. If you put a piece of fresh meat in contact with salt, or rub it over with the salt, the salt gradually absorbs the water, and draws the water out of the meat. The action is truly a drying action upon the meat, and it is effectual by a perfectly similar process to that which would go on if you exposed the meat in a dry chamber to a current of warm air. In like manner, of course, it is known to many persons that sugar is used just as salt is, to remove water from substances containing it in any quantity. If you were to rub any fruit or animal substance with a sufficient quantity of dry sugar, you would get the sugar dissolved by the water which would be removed from the materials; and amongst the observations which are made in common life, there are some which bear, in an interesting and instructive way, upon what I have been saying to you. For instance, I have heard it said that ordinary jam—fruit and sugar, which have been boiled together for some time—keeps better if the pots into which it is poured are tied up whilst hot. The observation has been so frequently made that one was inclined to think that there must be some truth in it; and I think if we admit that the paper can act as a strainer in the same way as the cotton wool, you will see at once that it must be as people suppose. Take two cases. Suppose one pot of jam, allowed to cool before it is tied down, little germs will fall upon it from the air, and they will retain their vitality because they fall upon a cool substance; they will be shut in by the paper and will soon fall to work decomposing the fruit. If you take another pot, perfectly similar, filled with a boiling hot mixture, immediately cover it over, though, of course some of the outside air must be shut in, any germs which are floating in it will be scalded, and in all probability destroyed, so that no decomposition can take place.

Amongst other materials which serve to arrest fermentation, there are several chemical agents of considerable energy, which are frequently employed for that purpose. Amongst the foremost, I ought to mention creosote, the active material of smoke; and I have no doubt that the antiseptic action which smoke is said to exert upon ourselves — because it is said that smoke is very wholesome, although I do not lean to that view myself — is due to the presence of this creosote or carbolic acid. Every one is aware that one process for preserving meat, which has long been in use, is to suspend it in a chimney in which the smoke of wood is present. The smoke of wood, like that of coal, contains this substance, or one nearly allied to it, and amongst antiseptic agents it is one of the most energetic. A small quantity of this carbolic acid thrown into that fermenting liquid would completely kill the organisms. In the same way, if I were to introduce a little sulphurous acid into any of these mixtures, I should immediately kill the organisms and arrest the fermentation. Sulphurous acid is now largely used for this purpose, being employed, in combination with lime and water, to saturate the cases in which beer is to be stored, so that the wood being impregnated with it, any germs which might find their way from the atmosphere, and set up a process of decomposition, are arrested and destroyed. Another very powerful antiseptic agent is prussic acid, one of the most powerful of poisons to all animal organisms, and it is particularly powerful in stopping the action of these ferments. Another substance, which I think is worthy of consideration, in the same point of view, is a mixture which is, to a great extent, of unknown composition. I refer to the poisonous matter which is given off in tobacco smoke. It must, I think, when present in the air, exert a very powerful antiseptic action upon these organisms. It has been shown, by the experiments of Professor Tyndall, that in the lower vessel of the lungs there are considerable deposits of the dust which floats about in the air; and we are, of course, exposed in that manner to the action of a number of the seeds of these ferments, and, for aught we know, of diseases, because many malignant diseases are attributed to processes of decomposition analogous to those which we have been considering;

and they may be — and, as some persons think, are — carried by germs in the air, in the same way as those I have been mentioning. Now, any powerful substance which would kill these germs must, of course, exert a beneficial action, and when persons are exposed to the smoke of tobacco, there is no doubt that some of it enters the lung with the air which is vitiated, and that some of the smoke must be deposited in the lower passages of the lungs with these little mischievous germs, and must certainly somewhat astonish them.

I have here several little apparatus, all alike in their general arrangement; each consists of two little tables, connected together in such a way that air may be made to pass through both of them in one direction, but not in the other. A tube goes from the top of one into the liquid in the second, and the tube from this second passes on into the air; and these bottles can, by means of an aspirator, be supplied with air which has been strained through cotton wool, and no other air can pass into them. The bottles contain the same mixture which I have been talking about so much, yeast-water and sugar, a liquid which decomposes in almost any way you like, for almost all these germs live in it more or less vigorously. After the liquid was put in, it was kept boiling for considerable time, so that there is, I trust, in the bottles no living organism whatever; in fact, I have reason to believe that any organisms which may have been there have been destroyed by the high temperature to which they were exposed. I might draw hundreds of cubic feet of air through that apparatus, and it would remain entirely unchanged. Next Monday we will resume this again. We will also examine this particular apparatus, which is exactly the same, with this exception, that after the whole had been filled in the manner I have stated, a little mould was introduced by a separate tube into the first bottle. The apparatus will be taken back to University College, where it will be put into the warm chamber, where the organisms will be developed; and I have no doubt the liquid in the first bottle will be in a state of active decomposition before the day is over. Then next week we will draw purified air, which, by itself, has no action on the liquid, and see whether it will carry

any germs into the second bottle. I have no doubt that, by Monday next, there will be enough mould upon it to enable us to perform the experiment; and I shall then also have the pleasure of telling you of some applications which M. Pasteur has made of his theoretical results to practical purposes, such as the preservation of wines and such like matters.

(To be continued.)

THEORY OF CARIES.

Translated from the German by Dr. CHARLES R. E. KOCH, of Chicago, Ill.

From the given historical review, it is apparent that the theories proposed for dental caries have been mainly attempted in three directions; at one time the vital, at another the purely chemical, and at another the parasitical processes were placed in the foreground, and combinations of these were made, from which several branches arose.

So long as the tooth texture was but little known we had to dispense with an anatomical foundation for the study of the carious process. Only after the fourth decennial of our century, after the histology of the tooth had gradually become established, could we think of subjecting the structural change in a carious tooth to a thorough examination.

But to proceed understandingly, there still remained a gap to be filled; this was to place the history of development upon a firm basis, which only occurred within the last ten years. Only after these preparatory labors, being supplied with better optical auxillaries, were we placed in position to follow up this process into its phases.

The older authors were mostly purely vitalists, as they had to acknowledge that teeth had vitality, and as the destruction in dental caries, which externally resembles gangrene in other organs, seemed to indicate a vital process.

As soon, however, as organic chemistry furnished analysis of

teeth and oral secretions, although not in an entirely satisfactory manner, and explained the process of fermentation with its many products, one was necessarily led to bring into the account in the process of decalcification the acids contained in the secretions, or formed by fermentation; then arose the chemical theory.

During the last ten years, the great extension and the injurious influences of parasitical creatures upon the animal economy became more and more known; researches after such vitalized beings were instituted in carious teeth; they were found, or believed to have been found, and the parasite theory was constructed.

Then came the fusionists, who divided into several bodies which, upon the one side, endeavored to bring into harmony vitalism with chemicism of dental caries, and considered it as a reaction closely resembling the inflammatory process on the part of the principally attacked hard tooth tissue (dentine), without losing from sight the agents instrumental in decalcification. Others united the influence of chemical agents with parasites; a third portion sought to unite all the three theories, and thus establish many varieties of caries. It was admitted that dental caries, in most cases, is dependent upon external agents, and advances from without inward; upon the other hand it was maintained that the same process can also advance in the opposite direction, and hence the caries which originates from the pulp has been designated as "caries interna."

Since we know that an exchange of material does take place during life in the dentine and cementum, as proven by the atrophies, hypertrophies and new formations, that a sensitiveness of the dentine exists, it is not to be denied, from the very beginning, that both these hard formations (tissue) react against external agents. This idea seems to have dimly appeared to some authors when they were inclined to accept the textural changes in carious dentine as of a vital nature.

That the sensitiveness, grown to painfulness, in dentine which has been deprived of its protective covering is of a vital nature, and is decreased when the most sensitive part of the organ, the periphery, has become destroyed by an external agent, probably

no one will doubt; from this, however, no conclusion can be drawn as to the capacity for reaction in dentine at the place attacked by caries.

The thickening and varicose swelling of the dentinal fibrillæ were ascribed to a vital process by J. Tomes, E. Neumann and H. Hertz. The former thinks that through the diseased condition the outlines of the formative cells are re-established. E. Neumann goes still further, and sees in sections highly colored with carmine, a proliferation of the cellular elements of the dentine, and bases upon this the analogy of dental caries with inflammatory and ulcerative processes in the soft tissues. Leber and Rottenstein only say that particularly in transverse sections the contents of the enlarged canals may be seen to divide into rod-like divisions, which may separate from one another a small distance. I have never succeeded in finding the carmine impregnated granular formations, after coloring, in the thickened dentinal fibrils, as they are described and pictured by E. Neumann.

The increased transparency around the carious locality of the dentine, and the, as yet, problematical calcification of the dentinal fibrils, are viewed by J. Tomes as curative efforts of nature to oppose further progress of caries. The carious dentinal cone, Magitot declares to be a reaction on the part of the pulp upon the agent acting from the exterior. This condition of irritation makes itself known by a production of secondary dentine, and through a molecular deposit in the dentinal canals, which become obliterated. Hence he views this latter appearance also as a vital process.

Even if it cannot be denied that the living pulp reacts upon the agent acting from without, yet the explanations of the above named authors, according to whom an inflammatory process of the pulp is made apparent in the carious dentine in the different ways named, is not correct, as Leber and Rottenstein have already explained. The dentine of human teeth, and of teeth made of the ivory of the Hippopotamus, inserted as artificial dentures, is affected by caries in precisely the same manner as the dentine of the natural teeth, so far as the dark or light colored zone, the granular condition of the dentinal fibrils and their

thickening or varicose swelling, are concerned. Hence the appearances which have been ascribed to odontosis do not belong to it as such.

The new formations of dentine which arise upon the walls of the pulp cavity, corresponding to the carious district of the dentine, can, as a matter of course be produced only by a corresponding part of the pulp, in consequence of a condition of irritation; they are a healing effort, a tissue of replacement for the loss of the periphery. These preponderate in caries which inclines to a chronic nature. In many cases not a trace of such replacement is found, and yet all the phenomena that have been named occur in the carious dentine. The inflammatory affections of the pulp are made manifest mainly, only when a considable loss of substance of the dentine has occurred, often when only a thin covering of the latter is left to protect the pulp, or when a perforation to the pulp cavity has ensued. Hence we have no basis, even if veiwed from this standpoint, to ascribe the changes in the dentinal fibrillæ to an inflammatory condition of the pulp.

It is known that dead animal tissues, under particular circumstances, may undergo a high degree of fatty degeneration. In pathological cases we frequently meet a fatty metamorphosis of the organs, and this has occasionally been cited as proof that the fat arises from transposition of albuminous matter. Accordingly there is nothing so very singular that in dead dentine, under favorable circumstances, fat may also be deposited, and we do indeed find it deposited in the form of drops in the dentinal canals.

Upon the other side it has frequently been proven that fungi may penetrate living, dying or dead animal tissues. Yes, there is a fungus, probably belonging to the mucor, whose spores may occasionally appear in drinking water, and which, when it luxuriates in dead bones or teeth, occasions considerable defect of substance. This fungus has no connection whatever with caries in the teeth, and is accidentally discovered in teeth which have been preserved in water. Just as small a roll is played by the protocosis dentalis, which has been named by Klenke, as occurring

in a special variety of caries, which he calls vegetative tooth destruction. I have found the same only upon one occasion; it has not been confirmed as belonging to caries by any author, and it is only an accident like the puccinia graminis in the scab of favus (favus barke).

Leptothrix buccalis, however, is found as often in dental caries, and in places is so deeply imbedded in the cartilaginously softened decalcification near dentine, that Leber and Rottenstein, express themselves to the effect, "That the differences in the progress of dental caries in enamel and dentine must have its cause in the participation of fungoid growths in the carious process." The elements of the fungus certainly luxuriate in the dentinal canals, and expand these, but, in my opinion, can only accomplish this when the dentine is either entirely decalcified, or has at least entered upon the first stages of decalcification. I have never found a fungous growth in the deeper layers of still hard carious dentine, and hence am of the opinion that the dentine, to a certain extent, must have died at an earlier time through the action of acids, when the fungus is enabled to grow on further. The progress of caries in dentine is accordingly, in my opinion, not to be ascribed to the fungus, but to the acids. When the acids become neutralized by the saliva, as at the lower incisors, no caries is produced, notwithstanding the extensive beds of leptothrix found in the tartar. With the origin of caries leptothrix has no relation; not before the existence of a carious groove upon the necks of the teeth, could I discover any leptothrix deposit nor any lines of leptothrix granules in the interior of the dentine. The granules in the dentinal canals in chronic caries consist of finely divided fat.

The influence of an acid I hold accordingly for a fundamental condition in the formation of caries in all such cases where decalcification may be proven to have progressed even to a small extent. In other cases where this proof has not been furnished (certainly in only an unreliable manner as in the so-called caries carbonacæ of the dentists), the chemical process lies still in the dark.

Even if we agree upon this influence of acids, still we have at this time not arrived so far as to answer the question, "Whether there are one or more acids, of which kind these, and as to where and how they are formed?"

The mixed saliva differs in its component parts not only in different individuals, but it is also variable in the same individual. Its known property to convert the insoluble flour of starch into dextrine and glucose, which latter, in the presence of a ferment, is capable of entering. An acid fermentation was considered by Leber and Rottenstein as proof that the acid reaction in the mouth is principally created by acid fermentation of remnants of food. If this were the reason, it would be difficult to see why animals, which are not capable of removing the remnants of food, like man, are so very seldom afflicted with dental caries. Some nationalities, which certainly are not very diligent in the cleaning of their mouths, as for instance the Esquimaux and New Zealanders, furnish a very small percentage of caries. The remnants of food show no evident action in extremely chronic caries; in the so-called central caries we also see that a cartilaginous softening of the dentine occurs without the aid of remnants of food. In numerous disturbances of the intestinal tracts a sour or salty taste is discovered entirely independent of the nutriment taken. Sputa of acid reactions, and the increased acid reaction of the mucous membrane of the vagina and bladder gives proof that mucous membranes are capable of furnishing abnormal acid secretions of themselves.

Magitot considers saliva, when it has become the vehicle for acid substances, as the agent in caries. Leber and Rottenstein are inclined to think that if fungoid growths have anything at all to do in the acid fermentation within the mouth, which is questionable, there are leptothrix; and they think with Oehl that it is highly probable that lactic acid is formed under this fermentation. Spence Bates (Odontological Soc. Great Brit. Rep. 1865), is of opinion that the disintegration of the dentinal fibrils takes place from within the tubuli, by which means free carbonic acid in a nascent state is brought into contact with the lime salts of the tissue, these under the development of acid are disin-

tegrated. The liberated acid, he thinks, is not lactic but phosphoric.

According to my opinion, the secretions of the gums with which the teeth are in nearest contact, and from which partially they receive their mucous covering, are particularly to be considered. Its frequent acid condition can be proven at a time when no remnants of the food are present. Where the gums secrete most, as in children, youthful individuals and women, particularly during pregnancy, caries takes a more or less acute course.

"We not seldom find," says Tomes, "in mouths which have many carious teeth, swollen and highly vascular gums, covered with a thick and sticky mucous, which may be drawn away in threads." He cites a case in which the teeth were rapidly decomposed by caries, and at the same time the quantity of secreted saliva was small; at a later period all the remaining teeth were attacked almost simultaneously at the margins of the gums in such a manner that a ring-like zone of softened tissue surrounded each tooth.

Tomes says, "When there is a copious flow of saliva and mucous secretions, the mucus closely adheres, in place of being distributed in the saliva, and is to be considered as the vehicle through which the tooth tissue becomes decomposed." The proof offered by Tomes, that the gums, in a state of iritation, can furnish an acid secretion, based upon the observation that cotton placed between the teeth will advance the progress of existing caries, is not well chosen. As Leber and Rottenstein suggest, this could be adduced from the fact that cotton, being a porous substance, must assist the fermentation and disintegrative process at the locality in question. In dead bodies with extensive dental caries, I have often found swellings in the gums with hypertrophy of the papillæ; certainly these may be consecutive diseases, nevertheless, the frequently contemporaneous disease of the gums is remarkable.

When the quantity of the oral secretions, including those of the gums, decrease, as in old age, dental caries takes a permanently chronic form. In places where the secretions of the gums can have less effect, or are more easily removed by the motion of the

tongue, caries occurs less frequently. When this is of an acute nature, and if the crown has been destroyed, it advances but slowly in the roots, as then the secretions of the gums have only a smaller direct influence. Notwithstanding the abnormal secretions of the gums are placed in the front rank, we do not wish to say that the anomalous secretions of saliva, mucous glands, and of the mucous membrane of the mouth, are to be considered as only of small importance, as the foregoing statements have sufficiently illustrated. Generally an injurious influence is only then to be ascribed to remnants of food, when a defective tooth structure or carious pit is present.

We must confess that our knowledge of the quality of the oral secretions is insufficient, and it is still a question whether these exert an injurious influence of themselves or through their products of decomposition. We do not know if more or less of only one acid shortens or lengthens the progress of caries (as lactic acid, of which organic chemistry teaches us that it frequently occurs in partially decomposed animal fluids), or if different acids accomplish modifications in it. We conjecture the presence of lactic acid particularly, as C. Schmitt, of Dorcas, has been successful in proving its presence in the sour juice of the hollow bones affected with mollities ossium. It is further questionable whether butyric, valeric and formic acids, which H. Fischer obtained from acidulated or strongly alkaline pus, do act as products of decomposition of puriform gum secretions.

When the enamel membrane becomes impaired in its continuity by cracks in the enamel, or if, through the deposition of leptothrix, it has become brittle and full of clefts, the lime salts in the prisms are more easily attacked, the enamel being more accessible to acids, as their very thin organic hulls cannot offer any resistance at all worthy of mention. Chemical analysis teaches us that the organic substances in the enamel are hardly more than two or three per cent. The action of acids is at first limited to a small range, and it is to be assumed with reason, that not only does a simple dissolution of the lime salts occur, but also that the acids do enter into a new combination, and the newly formed salts meeting an organic cement are easily crumbled.

When we remember that the acids spread along the course of the groups of enamel prisms, it is comprehensible that upon the one side their influence remains confined to certain limits, and upon the other an undermining of neighboring parcels of enamel occurs. The continuity of enamel prisms being loosened, the transparency of the enamel at the affected spot becomes interrupted and a white spot arises. When the acid action is slow, the coloring is deeper. Probably here occurs a compound process — a decalcification with decomposition.

If a defect in the enamel occurs within a circumscribed limit, this serves as a point of attachment for matter advancing from without, as stringy mucous, leptothrix and remnants of food, more easily remain in the notched grooves, which afford more points of attack to acids. The latter can now proceed with its deleterious influences undisturbed by the neutralizing action of the saliva, and the effect of this becomes apparent in the neighboring dentine, through a yellowish shading, at a time when thin layers of enamel still afford a protective covering to the same.

The larger the carious cavity in the enamel the narrower will be the entrance to the same, and of course the danger to the dentine will be so much greater, to be attacked more intensely and upon a more extended surface. As dentine has twenty-eight per cent. of organic matter, decalcification advances more rapidly in it, and an organic remnant called tooth cartilage remains after the extraction of the lime-salts. Through the action of acids the vitality of the dentine concerned becomes annulled, and decay commences from the periphery in a centrifugal direction, in which, as has already been mentioned, leptothrix buccalis is active. A carious cavity is formed in the dentine which mostly takes larger dimensions than that in the enamel, and affords a receptacle for remnants of food difficult to be reached. The latter enter into an easily understood acid fermentation.

The shape of the cavity formed by caries in enamel or dentine is partially according to the position of the tooth in which it occurs, and partially according to the quality of the enamel and dentine. The nearer carious cavities are to the roots of teeth the shallower they are, and, upon the contrary, cavities occurring

in the grinding surfaces of molars are always very large in comparison to their orifice. The thicker and more compact the enamel is constructed the greater resistance it affords, and the destruction makes so much the greater progress under the enamel covering; hence, in such cases, the cavity is always very deep, while shallow cavities occur when the enamel is thin and of loose texture. A greater surface of dentine is then exposed, and accordingly to a greater extent attacked.

The reason for the intensity of the carious coloring in enamel and dentine is not at all established; it can not be alone in the organically changed substances, as the discoloration is alike intense in both substances, and there is between these such a great difference in percentage of organic base. When the action of acids proceeds slowly upon enamel and dentine, the intense carious pigment does not enter very far, and the cartilaginous softening extends only to a thin layer, the disintegration occurs so gradually that a luxuriance of leptothrix can only occur to a very short distance.

If there is anything illustrative of the difference between caries in bone and teeth it is the caries in the cementum, which is also characterized by an advance from without inward, a successive coloring with peripheral dissolution. In the cheek tooth (schmery faltigen backenzähne) of the horse, in which the vascularized bony structure forms such a large part, the process is the same as in the human causation, with the exception that it is extremely chronic. The death of the bony substances advances from the exposed place step by step, without causing any inflammatory reaction upon their part.

As caries has been shown to depend upon external causes in all the three hard tooth substances, the question arises, "what process does take place in the very rare cases of softening and decomposition of the dentine from the pulp cavity toward the periphery?"

An observation of a case has been mentioned, in which, without a trace of common caries, a central dentinal softening occurred. Leber and Rottenstein also relate a case of so-called central caries in which in three incisors a bluish color was observa-

ble without a case of caries. In drilling two of these teeth it was found that the whole interior of the tooth to the enamel was completely softened, destroyed and of a brown color, even the roots deeply hollowed. The third tooth remained untouched. The patient remembered that during childhood she fell upon her teeth, upon which followed a swollen face.

Leber and Rottenstein give no explanation as to what causes brought about this discoloration of the dentine, and they think such cases cannot be identified with common dental caries. A. Scheller, of Warsaw, published two cases of this kind, of which the second is particularly instructive, and analagous to that of Leber and Rottenstein. He expresses the opinion that central dental caries is to be considered as a process of disintegration, superinduced by the decomposition of the dental pulp.

The condition in mortification of the pulp indicates the presence of sebaceous acid as a product of decomposition, hence it is presumable that in the mortified pulp, sebaceous acid may be formed which destroyed the dentine. Magitot found that butyric acid acted very much in the same manner and with the same energy upon the teeth as lactic acid. Certainly this so-called central dental caries cannot be classed as a species of dental caries, and must plainly be classed with the inflammatory diseases of the pulp.

The sickly and occasionally most loathsome odors caused by carious teeth has been considered, says Heider, as proof of the presence of internal caries, which is placed alongside of caries in the bone, and has been ascribed to a secretion of the dentine attacked by caries. But the really offensive odor is only present after the pulp cavity has been opened, and is caused by the gangrenous pulp; the bad odor in carious teeth in which the pulp cavity has not been opened, has its cause in the decaying remnants of food which accumulate in the carious cavities, and vanishes entirely by keeping these clean. One ought not to confound with this the odor from the accumulated secretions of the gums, and possibly stagnant blood between the teeth, which is particularly taken up by cotton applied in those places, and which makes this smell very badly.

The carious process can be arrested but not healed; an acute form may change to a chronic, or it may remain without any further progress at all,—especially is this the fact as above stated in carious roots, upon which, however, a cariously colored superficial layer may also be shown.

Duval and different other authors have bestowed the name of caries upon the partial defect upon the neck of a tooth, which resembles an abrasion (usur), and which defect is described as wedge shaped. Magitot has declared that these defects of the dental necks are healed or dry caries, notwithstanding he admits that they have all the appearance of a true abrasion, without, however, assigning any particular reason. This healing is said to result partially from the resistance of the pulp, and partially from the interruption of the injurious influences.

The secretions of the gums, and the mucous membrane of lips and cheeks, and remnants of food, may act as vehicles to the action of the acids; a certain period of time is essential, and this is less when the local conditions are more favorable to the retention of this acid vehicle. Hence we find the points of attack in the pits and grooves, interstices and facial walls of the teeth.

If we take equivalent acid vehicles, we find that the effect in different classes of teeth of the same individual and in different individuals differ.

Frequence of caries declines:—(*a.*) When the acid becomes neutralized in its action, for instance, in the case of the lower incisors, which are almost constantly bathed in the saliva, and when salivary calculus is deposited freely. The deposition of this probably excludes the carious process from the spot concerned, but does not prevent the advance of chronic caries upon the one side, while upon the other the deposition of tartar advances.

(*b.*) When the position of the teeth has been regulated in such a manner that their proximal surfaces are normal.

(*c.*) When the teeth are thoroughly taken care of and protected against the influences of injurious forces.

(*d.*) When the structure of the tooth is solid and has a normal smoothness of its surface.

(*e.*) When the structure of the whole dentures and the mucous membrane of the mouth, together with the glands, is a regular one in proportion to the influences of race and hereditary transmission.

The last named point gives the main reason for the frequency of caries in general, and stands in close relation to the structures of the whole organism. The quality of the food is only of secondary importance.

The structure of the individual tooth has an essential influence upon the progress of caries, and teeth may be grouped according to their capacity to resist. We still lack a method of investigation by which to determine more definitely the individual degree of hardness of enamel and dentine, the knowledge of which is of importance in treatment and prognosis. Alphous, in Cracow, has divided the teeth into six classes in regard to treatment of caries by file or filling.

Heider expressed himself upon this point in conversation with me, as follows: When we consider the predisposing causes in the structure of the teeth which are attacked by caries, we will find bluish or grayish white teeth with dull enamel very frequently simultaneously attacked by acute caries; upon the contrary, in yellowish white teeth with smooth, glossy enamel, generally only chronic caries, and in isolated cases. This first-named class of teeth is supplied with less solid enamel and with less compact dentine, which is to be observed to a certainty under the file or graver. There are teeth which can be worked upon, even with inferior files, and which leave upon the file a great mass of white smeary triturated dentine; when, upon the contrary, the second class of teeth oppose great resistance to the file, and even the best of files only take a comparatively small hold upon them, and only a small mass of white powdered dentine is left upon the file. There are then two qualities of enamel and dentine, the graduations of which limit the different relations of teeth to caries.

If what Gladstone cites in his lectures from Lasseigne be true, that the molars contain more mineral substance than the incisors, and that when the teeth grow older they distinguish them-

selves mainly by the great decrease in carbonate in comparison to the phosphate of lime, several points as to the course of caries according to class of teeth and age would have been offered.

From all that has been said we come to the conclusion that dental caries is a process having its origin in the abnormal secretions of the gums, and next in the remaining parts of the mucous membrane of the mouth and the salivary glands, and advances from favorable points of attack of the external surface in the direction of the pulp cavity. Through the decomposition of the secretions, acids are formed which extract the lime-salts of the hard-tooth substances and induce a disintegration of the tissues in the attacked region, in which no inflammatory secretion does occur. The process of decomposition is essentially promoted by the accumlation of the secretions and remnants of food, and under this condition the leptothrix buccalis enters luxuriantly into the diseased dentine. The exclusion of an acid in the formation of extremely chronic caries (sicca, carbonacæ aut.), is not scientifically established.

NEUMANN'S THEORY OF THE DEVELOPMENT OF BLOOD-CORPUSCLES.

Abstract of an Inaugural Dissertation by Charles W. Eales, M. B.

The development of the blood is certainly one of the least understood physiological processes, and especially is this true of its cellular elements. The most diverse opinions have been held respecting the origin of the white cells, their transformation into the red, and the ultimate fate of the latter.

In the first place, the embryonal development of blood was regarded as the key to the mystery; and since in the embryo the development of red corpuscles takes place from the white or lymph cells, through the intermediate form of a colored nucleated cell, a similar process was assumed to take place in the adult

body. Since, however, the intermediate form—a colored nucleated cell—could not be found in the blood of the adult organism, it was supposed by one party (Kölliker) either that these forms might exist in some part of the body not examined, or else that the absence of transitional forms was to be explained by the rapidity of the transformation. Another party gave up the theory of transformation of white into red corpuscles, and sought another mode of origin for the latter. Thus, according to Wharton Jones and Bennett, it was the nuclei of the lymph-cells which were transformed into the red corpuscles. According to H. Müller, the latter arose from a fusion of nucleus and cell in the smaller lymph-cells. Gerlach, Funke, and others, believed in an endogenous formation of red corpuscles in larger cells, while Zimmermann had recourse to some entirely different elements of the blood itself. Since, however, none of the latter views could be satisfactorily established, the tendency has been to fall back upon the hypothesis of a formation of red corpuscles out of the white corpuscles of the blood itself. There is no greater unanimity of opinion respecting the ultimate fate of the red corpuscles, though, in spite of the doubts of Kölliker, it seems probable that there is a continual dying off and new production of these elements; and it has been thought that a greater or less power of resistance to the action of water is a sign of the age of particular corpuscles. The origin of the white corpuscles has been pretty generally assigned to the spleen and lymphatic glands, for which the abundance of those elements in the vessels leading from these glands is a weighty argument. It has, however, always been a matter of the greatest difficulty to determine in what part of the body the metamorphosis of the blood-corpuscles takes place. This process also has been referred to the spleen, and especially on the strength of two peculiar structures met with there—(1) cells resembling the white blood-cells, but with a yellowish color; (2) cells said to contain red blood-corpuscles. The first form undoubtedly exists, as confirmed by Eales, in the rabbit's spleen, but loses its importance when compared with the more characteristic transitional forms observed by Neumann. The second form of cell at first excited great

interest, but its occurrence is so very variable and uncertain that it is probably correct to regard it, with Virchow, as a more or less pathological structure.

It has also been supposed that the metamorphosis of blood-cells may take place in the liver, and this because the red corpuscles of the hepatic vein are thought to show, by their greater resistance to the action of water, that they are younger than those of the portal vein, which are not only swollen up, but completely destroyed, by the addition of water. There are also many crenated and withered red corpuscles to be seen in the portal vein, but very few in the hepatic. These facts, if they prove anything, rather tend to show that the corpuscles in the portal vein are old and worn out, than that those in the hepatic vein are new; and the well known solvent power of the biliary acids for the red corpuscles makes it probable that these may be destroyed in the liver, and help in the formation of bile. But there is no proof that any new corpuscles are formed in the liver.

This enumeration is sufficient to show that, as regards the adult organism, no single point in the development of blood-corpuscles is yet satisfactorily established. Even that for which the most cogent arguments may be brought forward—namely, the origin of white blood-cells in the spleen—has recently met with the renewed opposition of Henle, who suggests, however, no other theory in its stead.

Prof. Neumann, of Königsberg, deserves the credit not only of having, more or less, overthrown the theories hitherto proposed of the development of the blood-corpuscles, but also of having successfully inaugurated investigations on this point which lead in an entirely new direction. He has pointed out, as Henle did, that the organs which have been up till now considered are comparatively unimportant, and has most successfully filled up the gap thus produced in microscopical anatomy by bringing the blood-changes into relation with a structure to which such a function has never been ascribed. Kölliker had, many years ago, with a sort of divination, expressed the opinion that the origin of the red blood-corpuscles from the white in the

adult organism would never be demonstrated until nucleated colored cells should be discovered. It was reserved for Neumann not only to discover the long-sought cell, but also to estabish, on several grounds, its character as a transitional form.

The views of Neumann are published in the *Archiv de Heilkunde*, vol. x (1869), p. 68 *et seqq.*, under the title, "The Significance of the Marrow of the Bones in the Formation of Blood." He there lays down two propositions:

1. There takes place in the vessels of the bone-marrow, favored by a considerable retardation of the blood-current, a transformation of abundantly-accumulated white cells into red.

2. A continuous passage of medullary cells into the vessels contributes to this accumulation of white cells in the blood vessels of the marrow.

This whole theory, for which a considerable number of more or less reliable arguments can be urged, gains at once a large amount of probability from the discovery, first, of the colored nucleated cells, and, secondly, of a remarkable accumulation of lymph-cells in the marrow, in virtue of which the latter acquires an importance with regard to the formation of blood, not only equal to, but greater than, that formerly ascribed to the spleen. Other important arguments are, however, alleged. Neumann has found, besides those nucleated and colored cells which he regards as the true intermediate form between the white and the red corpuscles, other transitional forms which, on the one hand, form a passage from the white blood-cells to the red nucleated cells; on the other hand, from these to the red non-nucleated corpuscles.

Neumann meets the objection that these colored transitional cells may be merely lymph-corpuscles tinged with blood coloring matter, by showing that their general character is quite different from that of lymph-cells, and, further, that they are limited to the osseous marrow. He accordingly compares them, as well as similar forms met with in the frog, to the nucleated red cells of the embryo.

The detailed description given by Neumann of the marrow refers especially to the marrow of the bones of rabbits, and he

regards the existence of similar relations in the human body as a matter of probability rather than of certainty.

Eales also has found these minute structural characters of the marrow to hold good only in the case of rabbits, and has not succeeded in detecting them in the human body. This difference he regards as possibly explicable by the fact that the human structures examined were those of persons enfeebled by disease, and also that they were not examined till some hours after death. Besides that, the human marrow, even that of children, is very different in appearance, even to the naked eye, from that of young rabbits, which may often be separated completely from the surrounding bone, in the form of a red cylinder. The *a priori* probability that similar relations exist in the human marrow will, very possibly, be confirmed by researches conducted in in some different method.

Eales also insists upon the fact admitted by Neumann, that the yellow fatty marrow which fills all the long bones in adults plays, at best, a very subordinate part to blood-formation; and that the observations must be understood to apply only to the red vascular marrow which is found in all bones in young animals, but in adults in the spongy bones only.

This structure is minutely described by Neumann, whose account is confirmed in the main by Eales. It consists of a remarkably developed capillary network, and of a special tissue, called by Neumann the medullary tissue, contained in the meshes of this network. The capillaries have this peculiarity, that their calibre is much greater than—on the average, four times as great as—that of the small arterial branches immediately supplying them, and this sudden enlargement of the blood-channel must cause a considerable diminution in the velocity of the blood. The capillary network is also very close, its meshes being only about half again as large, or less than twice as large, as the diameter of the capillaries. Within these vessels, especially in the wider portions, is seen a great accumulation of white cells, as well as "transitional forms" in variable proportion, and it is these which especially mark out the locality as the seat of blood metamorphosis. The tissue contained in the meshes of the

vascular network consists of a stroma of delicate stellate cells, anastomosing by means of fine prolongations, and thus forming a reticulation within which are contained, in the red marrow, a large number of lymphoid cells; but these do not occur in the yellow marrow. To this tissue Neumann gives the name of *medullary tissue;* and to the red form, *lymphoid medullary tissue;* it bears most resemblance to the cytogenous connective tissue of Kölliker, or adenoid tissue of His. The yellow matter, being without lymphoid cells, and having its anastomosing cells filled with fat, resembles ordinary adipose tissue. Since it is precisely in the red marrow, with its numerous lymphoid cells, that an accumulation of white or lymphoid cells is seen within the blood-vessels, the question at once arises, What is the connection between these facts? Are the lymphoid cells in the blood derived from those in the medullary tissue, or *vice versa?* Neumann supposes that the lymphoidal cells of the blood are formed in the medullary tissue, and find their way into the vessels by a process of immigration similar to, but the converse of, that of emigration observed by Cohnheim; though, of course, not in this case susceptible of direct observation. The difference is, however, very considerable between a cell finding its way out of a vessel in the direction of the blood-pressure, and into a vessel against the blood-pressure. In order to make it probable that the medullary cells do find their way into the vessels, it would be important to show that they exhibit amœboid movements. Neumann has observed that a small number only of the lymphoid cells pressed out of the medulla in a rapid investigation are without these movements, and concludes that it would be impossible to regard this small number as the only medullary cells; so that some of those showing amœboid movements must be medullary.

(*To be continued.*)

Operative and Surgical Dentistry.

"LUSUS NATURÆ."

Editors "Missouri Dental Journal:"

Gentlemen—The following singular "*Lusus Naturæ*," has fallen under my observation, and as I have seen nothing like it, will report for the JOURNAL.

Mr. J. R., aged thirty-six, had his superior incisors removed in June, 1865, and in the following October replaced by artificial dentors. Owing to the apparent irregular absorption of the alveolus, the dentist was obliged to send a model to Philadelphia and have teeth made to fit.

After wearing the plate two years a tooth made its appearance in the place formerly occupied by the right central incisor, or a trifle further back.

Coming west about this time, and not residing near a dentist, Mr. R. showed it to a physician, who informed him it was a growth of bone, but at a subsequent examination by another physician, was told that it was a tooth, and an attempt to extract was rewarded by the crown breaking away. In August last Mr. R. requested me to extract it and I did so.

It was in shape and appearance a wisdom tooth, the roots resembling those of most superior wisdom teeth, except that they were rather longer. The pulp chamber was triangular with two foramen at the apex of the root. Mr. R. informs me that previous to the breakage the tooth had three cusps.

Except the incisors before mentioned, and a right bicuspid (extracted about eighteen months ago), the teeth are all present, and in their proper places, except the right wisdom tooth. Did I get that tooth? If not, what did I get?

Yours, M.

Mechanical and Miscellaneous Department.

SECOND ANNUAL SESSION OF THE NEW JERSEY STATE DENTAL SOCIETY.

The meeting was called to order by the President. After the reading of the minutes, upon the favorable report of the Executive Committee, seventeen names were added to the roll of the Society. After which Dr. Stockton rose and addressed the meeting as follows:

He commenced by giving an epitome of the history of dentistry, from the time of the Pharaohs to the present hour, and congratulated his hearers upon the progress and present status of dentistry as a profession. He then proceeded to speak upon what he conceived to be the important elements of successful practice. He confessed to a high appreciation of successful men *as such*. It was the fashion with a certain class of minds to be-little success, but the more judicious in this age hold to the opinion that men who make their way to the front and maintain a high position in any legitimate pursuit in life must have merit. To prostrate one's-self at the shrine of riches or power, might be called "flunkyism," but reverential respect for success won in any honorable pursuit was worthy of worship. It was veneration for that type of manhood which most nearly approaches the Divine, by reason of its creative power. Occasionally pretenders met with seeming success for a time, and people spoke of *luck*. But true success comes not by chance. For men apparently adopt the same means to the same end, one fails, the other succeeds, and we say the latter is the more fortunate. But in reality their means were different. It is not by doing the right thing, but by doing it in the right way and at the right time, that we achieve the greatest triumphs in life. Again we must measure a man's success, not by the relation which his achievements bear to those of others, but by what he has him-

self endeavored. If he has obtained the object he had in view —provided it be worthy an honorable ambition—he is a successful man.

Concentration of thought and effort upon one's specific pursuit was an important element of success.

Self-reliance was a valuable quality, but the aid of professional brethren was by no means to be condemned.

The demand now is for associated effort. No practitioner could make his mark who ignored it. We can often learn more at the dinner table of an associate than in our own laboratory studying a difficult case. Successful men have not confined themselves to direct action or looked only to immediate results; not a few failures result from a lack of faith in and fellowship with professional brethren. The longer we live the more we will be convinced that social intercourse is a material means to success. Through its instrumentality valuable information is imparted and received, improvements in mechanical appliances, aids, etc., suggested, and experiences in difficult operations communicated; frequently the gain is palpable at once, and we count the advantage as we take off our dress coat, if not it will make itself manifest sooner or later.

Keeping up with the profession involves hard labor, but we should not be content with that; all acting upon that principle our profession would soon come to a stand. Contentment with what is already known, would, of necessity, end all progression. We are to be imparters as well as receivers—to endeavor always to add something to the department of knowledge to which our calling relates. Attainment to a full knowledge of the science and principles of his profession as practiced, is far from being a despicable object of ambition; but to enlarge its usefulness and augment its achievements is certainly more worthy of one's aspirations.

Over-sensitiveness oft-times interferes with a man's success. We must not be over-sensitive to attacks upon our pride. Every successful man has had much to mortify him in the course of his career; he has borne many rebuffs, sustained many failures; nor should we be discouraged over our mistakes and failures; scarcely

a practitioner among us but will admit he was (in a measure) made by his failures, and that what he once thought his hard fate was in reality his good fortune. Error properly improved became the stepping-stone to the highest success. Many a promising practitioner has been permanently injured by early success.

But it will not profit us or our reputation, or the profession, to publish our mistakes. Be it understood that by over-sensitiveness is not meant over-scrupulousnesss. Be ever scrupulous. Never get up any pretentious humbug. Never seek to undervalue the work of another. Never advertise to do better or cheaper work than your brother, to draw away patients.

In estimating the sources of success account must be taken of our habits and temperaments; men otherwise well qualified have failed to make a name in the profession, from neglect of attention in these important particulars. Most of us are sensible at intervals of feeblness aud weariness when we are seemingly incapable of any exertion; and we hesitate at such times to know what to do, whether it were better to make the will assert itself and go on, in spite of weakness and lassitude, and continual entreaties of the frail flesh, or let nature have her own way and succumb at once; again there is fear of doing what we have in hand badly—perhaps of having it all to do over, or of making on the minds of those we wish to influence favorable, an impression of weakness. On the other hand there is danger of making compromises with our active powers, and yielding to the temptations of indolence. We are in danger of mistaking idleness for debility. It is a difficult thing to lay down specific rules. Each practitioner should study his own temperament. If we know we are not indolent; if we have for the most part pleasure in the practice of our profession, and never need the spur, we may safely pause when our energies are flagging.

The speaker then alluded briefly to the question of manner, as involving an important element of success, though it was impossible to lay down specific rules upon the subject. He spoke in favor of liberality in extending the benefits of improvements and discoveries from one member of the profession to another, deprecating anxiety for patent rights, and pleaded for encour-

agement and aid to unfortunate, struggling practitioners. He closed by referring to the principles of Divine revelation, as those upon which all true success was above founded.

Dr. Maynard, of Elizabeth; Fitch, of New York, and Armes, were elected honorary members.

Dr. Colburn moved that the Secretary prepare an abstract of Dr. Stockton's address for publication by the dental journals.

The election of officers resulted as follows:

President—A. W. Kingsley, of Elizabeth.
Vice-President—G. F. J. Colburn, of Newark.
Treasurer—Lewis Reading, Trenton.
Secretary—E. A. Hanks, Rahway.

EXECUTIVE COMMITTEE.

Thomas Stephens, Trenton. William Dibble, Elizabeth.
J. C. Robbins, Jersey City. C. F. Stockton, Mt. Holly.
Leo. H. DeLange, Bordentown.

Resolved, That a committee of three be appointed to take into consideration the "Regulation of the Practice of Dentistry in the State of New Jersey, and, if practicable, have a law passed that no one hereafter shall be allowed to commence the practice of dentistry, unless they shall have passed a satisfactory examination before a board appointed in accordance with this act. Graduates of dental colleges excepted."

Drs. Stockton, Reading and Colburn the Committee.

After due consideration, Long Branch was selected as the next place of meeting.

Dr. G. F. J. Colburn, of Newark, was selected to deliver the next annual address.

MECHANICAL DENTISTRY.

Dr. Kingsley condemned Weston's Metal in toto.

Straight's Flexible Edge met with no better success at the hands of Dr. Chew.

Dr. J. C. Robbins objects very strongly to the odor of the celluloid base.

Dr. Hayhurs thinks the camphor in the plate would be liable to become dissolved in the mouth.

The Society was informed that Dr. Morrison was present with his burr machine.

SECOND DAY.

Drs. DeLange and Hanks then proceeded to give a clinic, filling teeth with gold, both using the rubber dam. Dr. DeLange demonstrated his method of capping the nerve, using oxy-chloride of zinc, finishing the rather difficult operation of filling the posterior proximal surface of an upper molar tooth without previous separation or preparation, very creditably.

Dr. Hanks inserted a simple crown filling in a lower molar, giving Dr. Morrison an opportunity of exhibiting his burring machine. It performed all the doctor claimed for it.

AFTERNOON SESSION.

Dr. Colburn does not use the rubber dam, but does not condemn it. Does not use it simply because he gets along perfectly well without it.

Dr. Stevens thinks it a valuable discovery, has used it since Society meeting with valuable results.

Dr. Hanks cured a case of alveolar abscess that pointed on the chin, by injecting the aromatic tincture of sulphuric acid; is indebted to Dr. Atkinson for the mode of treatment.

Dr. Kingsley gave a case in practice; necrosis followed abscess—dissected the gum, took away the sockets almost entirely on one side of the upper maxillary.

Dr. Colburn described Bacon's method of entrapping dentists who use the rubber without license.

Resolved, That the New Jersey State Dental Society, now in session in the city of Newark, strongly protest against and denounce the practice of advertising cheap dentistry now in vogue by those claiming to be dentists.

Only one unpleasant duty marred the harmony of the meeting, and that was the reprimanding of one of the members for unprofessional conduct.

E. F. HANKS, Secretary.

From the Canada Journal of Dental Science.

SOLICITING PATIENTS.

It is a generally accepted maxim with all respectable physicians and dentists, that any advertisement, card, etc., which draws attention to special methods of practice, or special reductions of price, whether fair or fraudulent, are unprofessional. Some time ago we discussed this subject pretty thoroughly in this journal, and Senaca's excuse for reiteration, that "a thing is never too often repeated which is never sufficiently learned," will justify us in again adverting to it.

Any ordinary advertisement, such as the simple name, profession and address, is no doubt a solicitation, but most of first class practitioners who never use this form, would, in most instances, prefer not to advertise at all, but may feel obliged to do so in self-defence. With this simple form, however, no one can fairly find fault, though some do.

But when these cards are carried around in one's pockets for miscellaneous distribution, and the individual is seen poking them into cars and conspicuous window panes; when friends are button-holed in the streets and several pushed in their pockets, and introductions are followed by the irrepressible presentation of a card, and the orthodox remark, "Any influence you can exert in my favor will oblige," etc.; when dentists "chum" with hotel keepers, and are fixtures of hotel doors and bar rooms, seeking notoriety and acquaintances in circles whose respectability is generally impugned; when packages of their cards are left in saloons and in the glass cases of shops, and the individual is everlastingly on the *qui vive* to obtain patients in every other way except through the channel of merit and modesty, then we have a kind of solicitation debasing to any gentleman, and injurious to the name and fame of the profession. Against the whole low trickery—for it is nothing else—of show cases, golden teeth, extravagant multiplicity of sign-boards, special advertisements, miscellaneous obtrusion of cards, hand-bills and posters, let those who respect the profession frown; for such attractions we know,

instead of being an indication of that similar advertising enterprise which in other businesses may be backed by real capital and worth, is almost invariably a sign of lack of ability in dentists who resort to their use. Let respectable practitioners educate the public in these points, and quackery will die of starvation, but so long as the people are left in ignorance, so long will flourish the race of dental charlatans and victimized fools.

If we expect to elevate and advance our profession in Canada, we must individually examine our position in regard to these and other points of ethics, and modify and remove objectionable associations, whose quackery is not one whit excusable because they have antiquity or example for their apology. When show cases and such traps are removed, when dental advertisements and dental door-plates leave no impress of assumed superiority, when the expositor who calmly sat down and in one breath defamed the entire profession the better to extol himself —silly ass!—is defunct or repentant, when they who sin against the honor of the profession resolve to abstain, when we are satisfied to call ourselves Surgeon Dentists without an array of less common and more high sounding appellations, when in fact, men aim to win position by merit, and enterprising zeal in their profession, then we may look for a golden age in dentistry, and a golden age not so difficult to be brought about as at first we would conceive. Quackery has flourished in all professions and countries on the silence of its victims and the *ennui* of its foes, and if impostors who exist do not repent, then expose them vigorously and constantly before the public. The present state of affairs in Ontario and Quebec should effectually check any new additions to their ranks, if the Boards of Examiners are faithful.

We have digressed a little from the subject proper of these desultory remarks, but in fact, all these questions of ethics run into one groove, and we shall persistently persecute these tricks of quackery until their promoters swear "total abstinence;" and the profession is purified of their contamination. "Whose head the cap fits may wear it."

QUACK DOCTORS AND BOGUS DIPLOMAS.

The quack diploma shop of this city, *alias* Eclectic Medical College of Pennsylvania, *alias* American University of Philadelphia, *alias* Eclectic University, *alias* American Cancer Hospital, with one Downs and Buchanan as physicians-in-chief, etc., etc., has been brought to a sudden termination by a movement of the Legislature to rescind the act to incorporate the Eclectic College, which gave them the power to confer the Eclectic degree, and make it a penal offence for them to pursue their practice of fraud in the bogus diploma business. Every friend of humanity, and especially every physician who has the least regard for his profession, should spare no pains to expose all the impostors who hold these bogus certificates, as it is well known that they have peddled them out to every one whom they could induce to pay from five dollars upward, without regard to their business, occupation, or character. For the extent of these frauds and counterfeiting diploma business, see *Forney's Press.*

We clip the above item from the *Phila. Independent* that our readers may fully comprehend the injury which has been inflicted upon the medical profession, as well as the outrageous imposition upon the public, by the set of men who have been engaged in this unprofessional business. Many of the young men of the country have been deceived by these pretenders, and are now occupying a questionable position in the profession, as well as in the community in which they are practicing. The holder of an illegal diploma, if he knows it to be such, and continues to use it, deriving from it the same rights, privileges, and immunities as are conferred by a legitimate diploma, is no better than those who issue the counterfeit.

[The above was a perfectly *legal institution*, having a charter from the legislature of Pennsylvania, and would have been a college *de facto*, as well as a college *de jure*, if it had had a qualified corps of professors, and had pursued such a course of instruction as reputable medical colleges pursue, and conferred degrees only upon those who had attended legitimate courses of

lectures and had passed a creditable examination, instead of having peddled their diplomas out to every scalawag, who would furnish them a thesis, and pay from $20 to $50 for their parchments. We are glad that public opinion has finally been roused up to such a point as to compel legislative assemblies to take cognizance of such monstrous outrages upon all the decencies of professional life.

Whilst a large majority of those who invest in such speculation, are no better than the venders of the diplomas themselves, still, there are occasionally some honest practitioners who are inveigled into the purchase of one, and he soon finds that he is shut out of all decent professional meetings and societies, and looked upon by all honorable practitioners in the profession, as an out-cast and a disgrace to the profession to which he claims to belong. We have never doubted but that an action for swindling would lie against any one engaged in that traffic, and it seems that this is the view taken of the matter in Pennsylvania. —J.]

JOURNALISTIC.

In the *Chicago Medical Examiner*, for July, we notice a "Report on the Medical Uses of Carbolic Acid," by Prof. Davis, of Chicago, by which it appears that this remedy, — which, by the way, was familiar to almost every dentist for nearly two years before the medical profession began to interest themselves in studying its uses, — has won a reputation for itself as a valuable remedy in many diseases, particularly in diarrhœa, accompanied with vomitings in infants.

The prescription for a child eight months old, was, in one case, as follows:

℞. Carbolic acid, in crystals, grs. iij; glycerine, pure, ℥ ss; water, ℥ ijss.

Misce. Give half teaspoonful every hour until the vomiting ceases.

We have tried a diluted solution of carbolic acid in cases of aphthous sore mouth, with the best of results. Also in some

cases of dyspepsia. We have no doubt but that it is a valuable remedy.

In an editorial, appears some remarks upon "Graded Classes and Consecutive Study in the Medical Colleges." This has reference to the changes lately made in the medical department of Harvard University, which we noted in the JOURNAL some two or three months since. We took occasion then to express our belief that it would prove a step in the right direction, and an augury of better days for the profession. We now find several of the leading medical journals indorsing this action of Harvard, and now we have other claimants for the honor of being the pioneer in this movement. We should not be surprised if it turns out that *all of the schools in the country had always worked upon that plan.* We'll wait and see.

In the *Medical Record*, for August 1st, we find detailed some recent experiments by Prof. Dalton, which bear directly upon the question which has arisen in relation to the time when glucose is produced in the liver. Some former experiments of Dr. Dalton seemed to indicate that although glucose was produced in considerable quantities in the liver after death, that the substance of the liver, examined immediately after death, contained no sugar or glucose; but more extended experimentation has convinced him that it can be found at any period, though in much greater quantities after some time has elapsed from the death of the animal.

Dr. Governeur M. Smith suggests that lactate, or the sugar of milk, may be also formed by the liver, and only separated from the blood by the mammary glands.

The "*Maine Dental Society*" has definitely settled the question as to the relative poisonous qualities of rubber, silver and gold plates. "The summary conclusions were, that the per centage of inflamed mouths was not so great as when silver was used, and a little larger than gold produced."

The profession will doubtless be under obligations to the Maine dentists for enlightening them upon the poisonous prop-

erties of gold plates, which it appears are but slightly better than rubber in this respect, and silver plates are much worse.

If such nonsense happens to be produced in a Dental Society, by some backwoods member, the Society should see to it that it should not appear in its published records, as it reflects too strongly upon the intelligence of the society which would allow such monstrosities to go forth in its transactions unrebuked.

The Medical Record says: "Ulceration of the frænum linguæ in pertussis is referred to by a writer in the Glasgow *Medical Journal*, as a diognostic sign of this disease." The writer seems to think it depends "upon friction of the frænum against the lower incisor teeth during the spasmodic expiratory efforts." It never occurs before dentition.

Our English Journal states that quinine biscuits are used in London. A small biscuit containing a quarter of a grain of quinine.

In the *Nashville Medical Journal* for August, we have a brief report of the last meeting of the Tennessee Dental Association, recently held in Nashville. From the report we conclude that the number present was much less than ought to have been present, and we hope our Tennessee friends will do better next time; and from the spirit exhibited by those present, we think the next meeting will be better attended.

In an article taken from the *New York Medical Journal*, is recorded a case of carbuncle, treated by Dr. J. C. Nott. A deep incision was made through the carbuncle, and this stuffed with cotton saturated with pure carbolic acid. The acid was in the same way in the cut every day for a week, at the end of which time "nothing was left to treat but the small open wound made by the knife and the acid."

The Register for August is mostly filled with papers and orginal communications from various quarters, and we must say that with our acknowledged disposition to find fault with the dental literature of the day, we are most happy in being able to state

that these articles are creditable to the authors and to the profession, and will repay a careful perusal.

In the proceedings of the New York Odontological Society, we find a report upon Operative Dentistry by Dr. Clows, in which a "peculiar species of hard tartar" is described, which he sometimes finds upon the roots of teeth, and which he thinks is "deposited by the lining membrane of the socket." These philosophies which are forced upon the profession from all quarters are very easily manufactured, and in very many cases not particularly creditable to their authors.

If it could be established that a periostal structure had the power of secreting tartar from the blood, and then could deposit it upon another contiguous structure, our physiologists would have to commence their works anew. We had better not overturn all the physiological facts, that have resulted from the labors and experiments of ages, by a single dash of the pen, unless we desire to be laughed at for our trouble. J.

The following specimen is indicative of the status of that portion of the dental profession, which is not generally represented in our dental societies and associations:

——— —— May 19th 1871

Dr Driscall Sir what Will you tax me to put three uper plats and two parshells under setts on Alumnum the money is redy when the Work is dun I dont work it well Dock I guess you think you wont git what I am oing you I will send it Just as Soon as I can and will pay you interest on the same I have about two hundred and fifty dollars Worth of plat work that is redy to put up I have bean trubeled about giting abase that will give satisfaction I would have had this work all put up and had the money for it but on the acount of not having A reliabel bace So I not put the up) hoos apratice doo yuu use far casting alumnum plats pleas ancer by return Mail and oblig yours

— — ———

NB I can extract fur five hundred dollars more this summer

— — —

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] NOVEMBER, 1871. [No. 11.

From The Pharmacist.

ON FERMENTATION.

By Professor A. W. WILLIAMSON, F. R. S. Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.

(*Continued from Page* 369.)

We had occasion last week to notice the effect of the atmosphere on the process of fermentation in several instances. I mentioned, among other things bearing on that question, an experiment of Gay-Lussac, in which he squeezed some very ripe berries of the grape under mercury, and kept them, with due precautions for the exclusion, as far as he knew, of everything except the grape-juice; he kept this expressed juice for some time quiescent, and then introduced a bubble of air, or a bubble of oxygen, the active substance of air, but he subjected the air or oxygen, before introducing it into this juice, to various strong influences, which must have destroyed any vital organism in it; and he found that the mere addition of the air to the quiescent juice caused a process of fermentation to commence and a formation of organisms to begin, that they developed themselves, and that the liquid fermented in the usual way. The fact of the fermentation commencing is, if we bear in mind the general results of M. Pasteur's researches, to be attributed to the pres-

ence in the mercury or in the grape-juice, or somewhere or other in the substances present, of bodies which, by the mere access of oxygen, were stimulated so as to develop themselves into these little vital cells. It is now known, I may say, that there are in mercury, unless it is purified with extraordinary precautions, always present some such organisms, capable of developing themselves under such influences; and it is probable, I will not say more than that, for I do not know, that in the grape-juice there may also be similar germs present. The functions of oxygen appear from that experiment—which has since been confirmed by other observers— to be essential, at all events, to the initiation of the process, and there is, in that respect, a remarkable analogy, which I think is interesting to call to mind, with the action of oxygen on other bodies, as shown by an experiment made by Humboldt many years ago. He got some grains of wheat from Egyptian mummies, which had been so long at rest that they were not inclined to grow, in fact, they could not be got to grow in the ordinary way. However, he stimulated them to activity by immersing them in a little chlorine water. It is well known to chemists that chlorine in the presence of water does oxydize, or cause the oxygen to separate and pass over to common organic substances capable of combining with it. Humboldt actually stimulated these sleepy wheat grains to life, so that they grew and germinated, and their descendants are still in existence, by the mere action of oxygen developed in that way.

In the process of wine-making and wine-keeping, the presence of air is one of the most important matters which have to be considered, and there has prevailed, and I ought to say there still prevails, to a certain extent, a difference of opinion regarding the functions of oxygen in these processes. On the one hand, it is known, as a matter of fact, that the processes of fermentation are performed under conditions such as that air has access to the substance. No actual wine or beer-making has yet been performed on a large scale on such conditions as to exclude oxygen. On the other hand, the experiments of Gay-Lussac established clearly that it is necessary. In some cases, however, in wine-making, it has been thought desirable to facilitate the access of

air to the substance; while other wine-makers think, on the contrary, that in the first process as little air should be present as possible; but there has always been some. The juice first expressed from the grapes has been very carefully examined with regard to the gases contained in it. If air has access to it, it is always necessary to know, in order to judge whether the air acts upon it, whether the air is dissolved by it, and whether, if dissolved by it, it is still to be found in the grape-juice as such, or whether it has undergone combination. Now, every case of the examination of must, or fresh grape-juice, which is not fermented, has shown that it contains a considerable quantity of gas, but no case has been established of free oxygen being present in it. Carbonic acid gas is present in it in a considerable quantity, and also nitrogen, in proof that the air had had access to it, but the oxygen which was taken up at the same time with the nitrogen from the air, was not to be got out from that must again. It had been taken up, and it had entered into combination with the substance, so that all the oxygen present was actually combined chemically with it. In that respect a good many observations have been made by various chemists, but I ought especially to quote those of M. Pasteur, which are exceedingly careful and valuable. He has shown that this substance not only eats oxygen, but digests it. The oxygen is not to be found in it as such. It is only present in the form of a compound, which is formed by its action on the organic matters there present. Then, when the wine-juice has been expressed, and when it has been allowed to remain some time in a suitable place, so as to undergo fermentation, with a considerable variety of treatment in different places with regard to air, for in some places it is thought desirable that the fermentation should be allowed to take place in open vessels, or in vessels to which the air can have access as freely as possible, whereas in other cases special care is taken to cover as completely as possible the vessels in which the fermentation is taking place, so that the air may have as little access as possible to the fermenting substance,— and I believe it is impossible to give any one general rule with regard to the best process for all cases of fermentation, because the materials which are subjected to fer-

mentation vary so considerably; they differ from one another in their composition so materially, and there are also other circumstances which are different,—for instance, the temperature, which has an important influence. Not only is the temperature in some localities higher than in others, but other circumstances are also different, and it would not be right to say, because air is found to be perfectly useless in some well-established cases during fermentation, that for that reason, it ought to be excluded, or even that it may be excluded, in all other cases of apparently similar fermentation. As far as a general rule can be laid down from present experience, I think it does appear certain that oxygen plays no part in the process after the first expression of the juice. Once the fermentation has commenced, it appears to go on as well if air is excluded from the substance as if air has access to it. There is, however, one circumstance which is considered by persons of considerable experience to be important in this matter, and which I ought therefore to mention, viz., that when fermentation takes place at a low temperature—and some fermentations are, with great care, kept at a low temperature—the products are found to be superior if the whole process is carried on, the temperature being kept exceedingly low, and in those cases it appears that an open vessel is certainly not in any degree detrimental. It is customary, in fact, to use an open tub when the temperature is low; and, on the contrary, it is usual to use a partially closed vessel, of course allowing for the escape of carbonic acid, when the temperature is high. When the first vinous fermentation has completed itself, it is customary, in the wine-growing countries, to put the still active liquid into casks, and the slower process of fermentation then goes on, which lasts a considerable time. During this second fermentation, there is very much the same kind of condition present as in the first, and there is always formed, in this subsequent fermentation, a considerable quantity of deposit, which is afterward removed with much care; either the liquid is carefully decanted, or, in some cases, it is removed by a process of rough filtration. The subsequent treatment of the wine, I mean the keeping of it in casks or cellars, and the subsequent keeping in bottles — and these two processes of keep-

ing it in casks and keeping it in bottles are quite distinct,—are not usually considered as forming part of the process of wine-making. It appears, however, from the investigations of M. Pasteur, that changes take place in the composition and the materials by these processes, which really are as essential to the composition of the product as any other part of it, and that they ought to be considered as later parts of the process of wine-making. In fact, the process of wine-keeping is, in theory, not to be separated from the process of wine-making, the keeping being a process making it more perfect than it was when first turned out of the fermenting vessels. Common experience corroborates that in a very remarkable way. Everybody knows the difference there is between new and old wine, and the changes which take place when the wine is being kept constitute certainly one of the most important parts of the general subject of wine-making. Wine, when its fermentation has been completed, is found to absorb air with considerable rapidity and avidity, and when endeavors are made to get out from this wine again the air which has been dissolved in it, it is found that some kinds of wine allow it to go, or part with it again, whilst other wines do not; and in this respect, a distinctive test is found between the qualities of the wine; for by observing this difference in the facility with which they give up the air which they have dissolved, and by comparing that with the qualities of wines in each case, a remarkable generalization has been arrived at. In this matter I speak upon the authority of others, for I have not confirmed it by my own observations. But all that I do know fully corroborates it. The rule is this, that whereas low-class wines, which people will not pay much for, give up again almost completely the air which they have dissolved, superior kinds of wine do not give it up again, they only give up the nitrogen, and hold the oxygen fast. The oxygen, which is dissolved in both cases, is held firmly, or is digested by the high-class wines; but it is not digested, but simply eaten by low-class wines. Observations have been made in this direction by a great many observers, especially Berthelot and Pasteur, to whom we owe most decisive results in this respect.

(To be continued.)

From the St. Louis Medical and Surgical Journal.

NEUMANN'S THEORY OF THE DEVELOPMENT OF BLOOD-CORPUSCLES.

Abstract of an Inaugural Dissertation by CHARLES W. EALES, M. B.

(*Continued from Page* 387.)

More important support is given to the theory by various facts which point to a multiplication of medullary cells, since these, as they must go somewhere, Neumann concludes must find their way into the vessels. He also draws attention to the variations in size of the medullary cells, laying down the proposition that great differences in the size of similar elements in a tissue must depend upon processes of growth going on in them. Moreover, he draws attention to the myeloid cells, or "*myeloplaxes*," found in the marrow of bones, which cells, according to Kölliker, arise from a proliferative increase of the small medullary cells, and finally divide again into a large number of small cells. If, then, according to Neumann, such a multiplication of small cells does really take place as these facts point to, there is no other exit for them than into the vessels; the nutritive changes in so stable a substance as bone being far too small to need so copious a supply of organizable material. The hypothesis of an *emigration* of white cell from the capillaries into the medullary tissue, and a consequent accumulation of them here, is rejected by Neumann on the ground that a tissue, like the medulla, enclosed in a hard shell of bone, is especially unfavorable for the emigration of cells, and that it is difficult to see what would become of the emigrated white cells, their return to the vessels being improbable, and their exit through the very scanty or almost deficient lymphatics of bone being equally so.

An unprejudiced consideration of all these circumstances must lead to the conclusion that, though the theory of Neumann is hardly susceptible of direct proof, it has, at all events, a great deal to say for itself; and that the marrow deserves, if any

tissue of the body does, special notice with respect to the question of the transformation of blood-cells.

Eales' own researches have been especially directed to the ribs, but he has obtained similar results from the apophyses of the long bones, the sternum, and the diploe of the skull.

The method of investigation, which is substantially that of Neumann, is as follows: A sawn-off piece of bone is gently pressed between a vise, or pair of pincers, till a thick reddish fluid oozes from the cut surface. This is removed with a pipette and examined under the microscope without any addition, and is most advantageously covered with small fragments of covering glass. An enormous abundance of lymphoid cells, of the most various size, at once strike the eye; true red corpuscles are present, but in very small number. The peculiar cell-forms designated as transitional, which are here so important, have been repeatedly observed to occur in varieties which may be arranged in the series described below—a series forming a perfect chain of connection, without any important break, from the white to the red cells, or at least hardly admitting of any other equally satisfactory interpretation. Beginning with the white or lymph cell, the series is as follows:

1. Colorless granular cells without a visible nucleus (ordinary lymph corpuscles).

2. Smaller cells of the same kind, without more irregular outline, and without a visible nucleus.

3. Cells almost of the same size, with a large granulated nucleus, and in its neighborhood a few scattered granules; and also with an annular or crescentic slightly yellowish border.

4. Cells of the same size, with a smaller border, a somewhat smaller nucleus; no granules.

5. Cells of about the same size, with a sharp outline, a somewhat more distinct yellow color, and a still smaller granulated nucleus in the middle (half-way or middle stage).

6. The same, with a more or less homogeneous, sometimes slightly concave, nucleus.

7. The same, with scattered irregular granules (remains of the nucleus).

8. More decidedly yellow; somewhat smaller; without nucleus.

9. Yet smaller; more intensely colored, without nucleus (ordinary red blood-corpuscles).

It will be seen from this short description of the different cell-forms that they constitute so unbroken a series that one might be tempted, on this basis alone, to refer the metamorphosis of blood-elements, without hesitation, to the marrow; if, however, there were no confirmatory grounds, the author would not venture to draw this conclusion, since the cells in question might be susceptible of another interpretation.

The process of transformation appears to be, judging from the series of forms above described, as follows: the granulations in the lymph-corpuscles diminish from the periphery; next they lose near the centre some scattered granulations, while the remaining hyaline substance begins to be colored yellow so soon as the granulations have quite disappeared, though with little general diminution in the size of the cell; the nucleus, previously granular, become small and homogeneous,—while the whole cell is still but little diminished in size,—and it is not till the nucleus has first broken up and then quite disappeared that the size of the cell is materially diminished.

Neumann, who refers to this process only in the following words, "The protoplasm becoming colored and at the same time homogeneous,—after that disappearance of the nucleus,"—does not seem to understand the process of transformation quite in the way sketched out, and draws especial attention to cells which are more or less homogeneous in the centre, but retain their granular character at the periphery. If, however, they represented traditional forms on their way to become red corpuscles, there should also be forms with a yellow coloration in the centre, which is not the case. Hence these forms described by Neumann may perhaps not be transitional forms at all, but rather modifications of the ordinary lymph-cells which are on their way to perish altogether. The probability that some do thus perish before conversion into red corpuscles has already been pointed out by Virchow.

With respect to the frequency of these traditional forms, they may be found in larger or smaller numbers in the fluid from all *red* marrow; at least the characteristic nucleated colored cells have never been found entirely wanting. Examinations have been made of the bodies of new-born children and adults of every age, including, in one case, a woman of ninety-eight years of age. The assertion of Neumann, that the number of transitional forms diminishes with increased age, was found to be confirmed in the extreme cases; but for intermediate cases, or generally for any universal conclusions, the number of cases (twenty or thirty) seemed insufficient. Four special cases seemed worth more detailed notice:

1. In a case of Addison's disease, the medullary fluid contained, properly speaking, *nothing but* white cells, and the transitional forms were fewer and less distinct than in any of the other cases.

2. In a woman who died of puerperal hæmorrhage, transitional forms in all stages of development were extremely numerous and well defined.

3. In a woman who had committed suicide (poisoning with hydro-chloric acid), transitional forms were more distinct and somewhat more numerous than in the case of individuals dying of a long or short illness.

4. In phthisical patients, about as many transitional forms as in the second case. The constant occurrence of colored cells with two nuclei was very noticeable; in one case there was a cell with three nuclei.

It should be mentioned that almost always more transitional forms were found in rabbits than in the human subject.

Cases of leukæmia were also investigated. In a case of Neumann's, he had previously observed that the vascular network, generally so richly developed in the medulla, was absent. The medullary cells were not only extremely numerous, but showed very remarkable difference in size. The few vessels which remained contained almost entirely red corpuscles. These very interesting results agree perfectly with the view that the abundance of white cells in the blood, which characterizes this dis-

ease, may be due to a diminished conversion of white cells into red, as well as to an increased production of the former. It is, however, clear, from the occasional occurrence of colored nucleated cells in the blood of leukæmic persons, that the blood metamorphosis cannot be entirely suspended, the probable explanation being that these cells have left the marrow before their complete transformation.

Eales had the opportunity of examining a femur and a rib of a leukæmic person, but not till they had been long preserved in spirit. In these specimens he found the medullary cells well developed and numerous, the vessels containing what looked like white and red corpuscles. No transitional forms were seen, but the weight of these observations was diminished by the fact that they were not made, as Neumann's were, on fresh specimens.

[EXTRACT FROM]

A PAPER READ BEFORE THE "SOUTH LONDON MICROSCOPICAL AND NATURAL HISTORY CLUB."

BY DR. ROBERT BRAITHWAITE.

* * * * * * *

Biology, or the study of living things, naturally divides itself into two parts, the animal and vegetable kingdoms. Taking a rapid survey of the vegetable kingdom, we place the *Algæ*, or water-weeds, at the bottom of the scale, together with the minute forms (*Diatoms* and *Desmids*) found in our ponds. Following these come the *Fungi*, and above these *Lichens* and *Mosses*. Next we place the *Ferns*. These form the *Cryptogamous*, or non-flowering plants. From these we pass to the *Phænogamous*, or flowering plants, in which pollen is produced. As well-known objects for the microscope, I may just refer to the pollen, to the cuticle, or skin covering the leaves, with its stomata, or breathing pores, and various forms of hair, and to the modifications we may notice in divers seeds. Passing next to the animal kingdom, we find that the lowest animals, like the lowest plants, are of the

simplest structure, as a type of which I may mention *Amœba*, a little gelatinous speck we find gliding on the surface of ponds. After this we get species invested in a thin flexible shell, and so we pass on to those beautiful perforated organisms dredged up from the ocean bed. Next come the *Sponges*, and after these we have the great group of *Infusoria*, the animalcules *par excellence*, for some of them are the most minute of living creatures, all of them interesting to watch when living, but unfortunately not capable of being preserved satisfactorily. The great divison of *Articulata* embraces animals whose limbs are composed of jointed segments, and organs in lateral pairs. Lowest of these, and passing as it were from the last group, are the Worms, which have of late acquired considerable importance, from the mode in which even human beings may be infested by them,—I refer to the *Trichina spiralis*, that minute worm which, sometimes by millions, inhabits the muscles of animals used for our food, and which thus get introduced into the human economy. The *Rotifera* include many beautiful microscopic animals; there is still much to be learned, respecting their anatomy and life-history. Above these comes the group comprising the Crab, Shrimp, and Lobster, as well as many minute forms which abound in our ponds. Following these is the group comprising the *Spiders* and *Mites*. Both are especially worth investigation. We now arrive at the great class of insects, the study of which, or *Etomology*, has now become most ardently pursued. As objects of interest, even to the young, few surpass a well-mounted collection of insects; and I do look forward to the time, I trust not far distant, when the insect fauna of the district shall be represented in the cabinets of this club by actual named specimens. The last great division of the invertebrate animals, are the *Mollusca* or Slugs and Shell fish, but of these time does not permit me to speak. I may at least mention the names of the vertebrate animals, these being Fishes, Amphibia, Reptiles, Birds, Mammalia, and by these we reach the prince and head of all creation—Man. And what does the microscope teach us with regard to ourselves? Not that we stand apart from the rest of the organic world, but that of the many thous-

ands of living beings, each forms a link in the vast chain by which even Man and the Amœba form one harmonious whole. To man, however, is given something more—knowledge, reason, and consequently responsibility; and by these we are led far beyond the limits of the small circle in which we travel, still to find ever out-reaching the farthest grasp of instrumental power, yet present every moment to our unaided vision, one Creator and Preserver of all, by whom, and through whom, we, and all things, live, and move, and have our being.

From the Monthly Microscopical Journal.

MR. LOWNE ON PANGENESIS.

At a late meeting of the Quekett Club, Mr. Lowne, in making some observations on the white blood corpuscles of the newt, made some forcible remarks on the subject of *Pangenesis*. He recorded the experiment of Cohnheim on the blood corpuscle. If the swim bladder of a fish be filled with a solution of common salt, containing one per cent. of salt, tied and inserted under the skin of a rabbit or frog, after a short time, say twelve or twenty-four hours, it would be found filled by a large number of leucocytes, which had found their way into the bladder by permeating its walls. These were alive when they left the living tissue of the animal, but after going through the bladder their movements no longer continued, as they died in the saline solution; hence they were unable to escape from the bladder, and a large number became entrapped. This result not only applies to the swim bladder of the fish, for, according to Cohnheim, if the cornea of a frog's eye be taken (it must be quite fresh) and inserted under the skin of a living frog, in the course of twenty-four or forty-eight hours it will be found, upon examination, to contain a large number of leucocytes at various depths in the tissue of the cornea. Mr. Lowne considered these to be very remarkable properties, and he laid much stress upon them as throwing a great deal of light upon the doctrine of *Pangenesis*,

as enunciated by Charles Darwin, by which doctrine it was supposed that particles or gemmules were given off from every part of the organism, capable of reproducing like parts under certain conditions, and of being collected in the *ovum*. The whole animal was thus permeated by particles passing off from the living tissue. It had been objected to by Dr. Lionel Beale, that these particles, being solid, could not pass through the walls of a living cell; but if leucocytes could pass through solid tissues he could not see why minute gemmules, which might be solid or semi-solid, like leucocytes, should not pass through cell walls. He could not see why there should be any serious objections to the doctrine of *Pangenesis*. There was great difficulty in distinguishing a solid from a fluid. If the *Protozoa* be examined, many of them would be found to exhibit a series of gradations of solid matter, harder externally and softer internally; but no lines of demarcation could be drawn between the solid and more fluid parts of those animals, as one portion of the protoplasm shaded insensibly off into another.

Operative and Surgical Dentistry.

From the Canada Journal of Dental Science.

AMALGAM EXPERIMENTS.

By S. P. Cutler, M. D., D. D. S., New Orleans.

I took of good amalgam twenty-four grains and mixed with mercury, usual way, and expressed through buckskin to the proper dryness, then washed in alcohol and weighed. Thirteen grains of mercury had been retained. After two weeks, I weighed again and found a loss of two grains, the whole weighing thirty-five grains, a little less than half as much mercury as of silver and tin. The small amount of evaporation of mercury in thirty-five grains of amalgam is so insignificant, that no possible harm could take place by the use of even that amount at one sitting,

which would be sufficient to fill several quite large cavities, though in some extreme cases double the amount or more may be used in one tooth, even then no danger of salivation need be apprehended in any subject.

By applying heat with the blow pipe the dry lump became soft and plastic, as when first mixed, only a little more brittle.

The chemical affinity between the mercury, tin, and silver, is very strong and not easily broken up, and is known as the law of adhesive affinity or that of wetting, which is explained in this way: Any liquid whose affinity or cohesion is greater for any solid than the cohesive attraction of its own molecules, a perfect solution or saturation takes place.

Again, any liquid whose affinity or cohesion for any solid is more than half what it is among its own molecules, simply wetting takes place, nothing more.

Any liquid whose affinity for a solid is less than one-half what it is among its own molecules no wetting takes place at all, as mercury and glass, porcelain and many other solids, as mercury and bone or dentine demand. The reason why water and oil or mercury do not unite depends on this same law. The word adhesion and cohesion may both be used in the above explanation. This specimen softened by heat, and gave up the mercury, though rather explosively, so that I could not ascertain the final result by the blow pipe. In fact, this is a feeble fulminate.

Pure Silver Amalgam.

Twenty-four grains of pure silver filings combined with twenty-eight grains of mercury when expressed through buckskin as an ordinary use of amalgam in filling teeth. It will be seen that pure silver requires more than double the amount of mercury to amalgamate it than ordinary tin and silver combined.

Pure silver does not make a tough and tenacious mass, only slightly adherent. Washing with alcohol does not produce any dark color as in ordinary amalgams.

No loss or subsequent hardening takes place by standing for six days, weather hot. On applying heat with blow pipe, light colored fumes began to pass off and continued to escape frequently

in sudden gusts, and continued up to a red heat, at which temperature I kept it for a few minutes until all fumes ceased. It did not become soft and plastic at all, like ordinary amalgam, but remained hard during the process, becoming light yellow, and did not lose any of its coherent properties by heating. There was a loss of twenty-four grains out of the twenty-eight of mercury.

Amalgam of Pure Tin Filings.

Twenty-four grains of pure tin filings took up fourteen grains of mercury, forming a mass in all respects similar to ordinary amalgam: did not loose in weight by standing several days. Washing with alcohol produced about the same amount of dark matter as common amalgam. There was no subsequent hardening from the first, melting on charcoal for fifteen minutes, caused no loss in weight, no fumes escaped. After cooling, the mass was found to be quite hard and tough, polished well, and pure white.

The probability is that this amalgam would not harden sufficiently in the tooth to make a good filling.

Silver Coin Amalgam, or Amalgam of Olden Time.

Twenty-four grains of coin filings take up thirty-two grains of mercury to amalgamate. After several days' standing I found the mass hard and firm, had scarcely lost a grain in weight. On applying heat it did not become at all plastic, but remained hard. I continued the heat up to redness, for at least twenty minutes before the mercury fumes ceased passing off: on weighing I found nearly all the mercury had escaped; the lump still remained hard and firm though brittler than before applying heat.

Now, the question is, what holds the filings together, when all but a trace of the mercury has been dispelled by heat? Washing with alcohol produced dark matter.

Pure Gold Amalgam.

Twenty-four grains of pure gold filings take up fifteen grains of mercury to amalgamate. It instantly becomes white like pure silver amalgam; on standing several days there was no loss

in weight, neither did it set or harden to any extent, in consequence it will not answer for filling teeth. There was no stain from washing. On applying heat with the blow pipe, up to redness, for five minutes, it became yellow and lost all the mercury and two grains more. The filings were not melted, and the mass much tougher than before heating. On melting the gold there was no more loss of weight, the gold apparently as pure, and worked as well as though there had never been any mercury in combination.

This amalgam would be a desideratum in practice if it could be made to harden in any way.

Eighteen Carat Gold Amalgam.

Twenty-four grains of eighteen carat gold *silver alloy* take up twenty grains of mercury to amalgamate. It does not become so instantaneously white as pure gold, neither was the white so intense.

On washing with alcohol there was scarcely any stain. After several days drying there was no loss by evaporation, the mass becoming quite hard and brittle. This amalgam will answer a very good purpose in some cases for filling teeth. I have had a filling of this kind in one of my back teeth, five or six years, now perfectly sound, only dark on the surface owing to the silver it contains.

On applying heat to the specimen, and raising up to redness for five minutes, all the weight of mercury disappeared, still leaving a hard firm mass, which takes a fine polish and has a golden color.

Amalgam of Cadmium.

Twenty-four grains of cadmium filings amalgamate with forty-two grains of mercury, and sets or hardens almost instantaneously if quite dry, even without squeezing through buckskin. On rubbing in the palm of the hand the finger becomes black, and on washing with alcohol about the same amount of dark matter is produced as in common amalgam.

On drying for several days it loses nothing in weight.

While rubbing in the palm of the hand a considerable amount

of heat is developed, I presume, from the rapid conversion of the liquid mercury into solid, the latent force of the fluid mercury being transformed into sensible heat.

This amalgam is almost certain to destroy the nerves in all teeth filled with it, turning the tooth yellow and staining all the balance at the line of the gum the same color. This yellow stain is the result of a yellow soluble oxide, the fillings remaining white owing to the solubility of the oxide.

The specimen lost one grain after several days drying. On melting on charcoal it does not evaporate or loose in weight, and melts at a very low heat, and remains fluid a long time and retains the white color.

After being melted it is very tough and may be hammered or rolled into a plate, and cuts easily with a knife. This amalgam may be found valuable for some purposes out of the mouth.

There are some dentists still using this amalgam to my knowledge for filling teeth. It should never be used in the mouth under any circumstances.

By heating cadmium sufficiently hot, yellow vapors of the oxide of the metal are formed. Mercury unites readily and hardens with this metal, but does not harden to any extent when united with any of the other simpler metals experimented with. Why this is so, I am unable to say, unless it is from the fact that mercury and cadmium are the only two metals whose combining volumes of vapor are double that of any other elementary bodies. All good amalgams must be composed of at least two metals besides mercury. None of the above metals decompose water to any extent under ordinary circumstances.

I experimented with platinum and mercury, also aluminum and mercury, but found that neither of them formed metallic amalgams with mercury, only oxides of which I shall have occasion to speak sometime, under another head, more especially that of aluminum. This metal is one of the most selfish and unfriendly of all known metals, refusing to unite or form any metallic alliance with any other metal. This is a great and wise provision in nature's economy, this metal forming, as it does, the basis of most soils; the earth would be but a barren waste

if this metal held strong affinities for other metals; when the earth was in a melted state alloys would have been formed without end, so as to have prevented its capacity for uniting with oxygen to form clays.

The metals suitable for amalgams are reduced down to three, silver, gold, and tin, mercury forming the amalgamating metal. Tin and silver make the best; silver and gold answer very well; gold and tin are too brittle and hard for practical purposes; they do not harden at all when amalgamated; none of the other metals will answer as they would not stand in the mouth.

From the Canada Journal of Dental Science.

THE COUNTRY DENTIST.

In discussing various points of ethics, with reference more particularly to advertising and fees, we feel that we may have omitted to do justice to a large and important class of the profession, whose position "out of town," in a sparsely-settled country like Canada, and among a people so ignorant of dentistry as the mass of Canadians, is certainly peculiar.

In the very outset of his career in Canada, the country dentist finds himself among farmers who know comparatively more about the care of the mouths of sheep and cows than their own, and among a large class who need dental cuts in newspapers, and show-cases in the streets to attract their attention to the fact that the "Dentist" attends to the teeth, with something of the degree of intelligence as the four year older, who requires the illustrated picture book to deepen the impression in his mind, of the difference between a wheel-barrow and a spade. The degree of enlightenment is somewhat higher in the cities and large towns; but there still exists for all dentists in Canada, a tangible difficulty in overcoming ignorant prejudice and penurious "economy" with regard to the teeth. To this condition of things we may attribute certain breaches of professional ethics by dentists practising out of town, and who might possibly starve if they

conformed to rules suitable for the town and suitable for a population well informed, and fully appreciative of the value of the teeth.

What would be considered eccentricity or carelessness in the matter of dress, for instance, in the city, is simply a matter of custom and comfort out of town; and the gayest dandy is only too glad to throw off his swell toggery and enjoy the release of a rough mufti and a *tout ensemble* to please himself alone. In most other circumstances there is a conventional difference between the city and country, to which most of us conform.

There are moral and professional principles which no circumstance of residence can annul; but it would be drawing too fine a parallel to say, that just as a man should be a christian in the country as well as in the town, so should a dentist be a consistent observer of dental ethics framed mainly by city dentists, or by dentists in larger and more intelligent country communities than we find in Canada, wherever he may happen to reside. The parallel is not fairly drawn. The one is a question of moral principle and life, as indelible as the very heavens, to be cherished regardless of cost; the other a point of honor, but still a point of existence, — and human nature may die for a principle involving a theology, but will not tolerate rules of etiquette which involve its sure starvation. Debt and family responsibility are casuists, and we assume that the men who profess a readiness to perish rather than break a rule of professional etiquette are pretty well convinced beforehand that they will never have the chance to be tried.

In codes of dental ethics there are generally, first principles of good manners laid down which we do not think are at all unnecessarily detailed, and which certainly ought to be instinctive and innate with dentists in every sphere. Kindness, firmness, patience, willingness to explain mysterious points of practice, and ability to do so, are circumstances of timely education, and if a code of ethics can instil a condition of character, so much the more credit to the code. But in regard to the matter of advertising and fees, we must do justice to the circumstances of the country dentist in Canada. While we hold that

the city dentist has no excuse for resorting to hand-bills, posters, and other forms of advertising than the ordinary card, there are fair reasons for excusing the country dentist, in Canada at least, should he feel it necessary to do so ; and yet there is no excuse on the other hand, for the country dentist who makes use of these means to call attention to the lowness of his fees, his special modes of operating, or his superiority over neighboring practitioners. It must be remembered that the country people in Canada are difficult to reach ; that they do not all take newspapers ; that they are more zealous of the time necessary to be devoted to good operations, have expenses of board and lodging in many cases, while remaining to have dental operations completed, and have actually to be coaxed to be educated to care for their teeth. Many farmers never visit the dentist in his office, but wait for the traveling practitioner, and dental operations are performed in the precarious steadiness of rocking and arm chairs, and under other circumstances prejudicial to success. If the people were better educated in dentistry, they would never encourage the traveling dentist who goes from house to house to solicit or perform operations. They expect their teeth can be repaired like tin kettles, and class the dentist with the gipsy and peddler. Had traveling dentistry been in the hands of honest men, much good in educating the people on dental matters might have been accomplished ; but it has served to deepen prejudice because so much in the hands of dishonest men. These facts show the difficulties to be met by the country dentist of to-day ; that he has to pave the way for practice in most cases by a previous education of his patients.

In this light, of the country dentist doing his best intelligently and honestly, we see the necessity for some traveling dentistry at present, but no more excuse for quackery on the country road than quackery on Notre Dame street. We see, too, the actual necessity for modest hand-bills and posters, and advertisements in the newspapers, but again, let us reiterate, no reason at all for bombastic egotism and absurd pretention. We have no more defence for dental cuts and show-cases for the country dentist than for his *confrère* of the city ; and while regretting that the

state of dental education among the people is so low as to necessitate the same means of calling their attention to the presence of a dentist as the visit of a circus, we have faith that better days will come, and that Canadian farmers and village residents will welcome the appearance of the honest dentist among them, and will not require persuasion to have attention paid to their teeth.

Let country dentists frown down such intolerable conceits and high-flown quackery as we still see in the advertisements of some practitioners, and avoid imitating a bad example, even if it be imported from the town.

With reference to fees, the country dentist ought to operate for lower fees than city dentists, because his expenses are much lower; but on the other hand, if he can render equally good, and as many can, *superior*, work to the large majority of dentists in cities, we do not see why any circumstance of residence should make him lower his fees. We know some dentists practising in country districts of Canada, who demand higher fees than practitioners in some of our large cities, and others who attracted patients to them from a distance by their superior skill, and who were paid much higher fees than the large majority of city dentists could have obtained for similar services in town. Such appreciation is the exception, not the rule, in Canada; but it is well to chronicle these facts, as indicative of what can be done by skill in practice, and dignity in demanding fair remuneration. Patients going to town have the expenses of board, etc., in addition to higher fees to pay, and run the risk of getting into the "dental slaughter houses" to be found in most cities. Those are indisputable facts which should stimulate country dentists to aim at excellence. A tooth cannot be filled nor a set made any cheaper in the country than in the city, if honestly done, because where the country dentist has the advantage of smaller expenses, the city dentist has treble the amount to do. In nine cases out of ten the country dentist is a better operator than the same proportion of city dentists. His position conduces to quiet study; his physique and health is superior; his nerves are more under control, and he may, as many do, find a friend and mutual

educator in the village physician, both of whom react on the other, and tend to mutual knowledge and improvement. What kills the country dentist is a want of friendliness with confrères, and an effort to underbid to gain a practice: while there has been some indulgence in personalities, and miserably mean reflections and inuendoes in the papers, discreditable to members of a profession which now ranks in Canada with the leading professions of the day. Fee bills in Canada for town will not serve for the country, simply because very many of the people would rather lose their teeth, than expend as much for their salvation as they would for their beer, and grudge a professional man a whit more profit than the one who makes their boots. The remedy lies in educating them by means of the press, by publishing reliable information in regard to the teeth, without any advertisement appended; by educating in the office, by doing one's very best conscientiously in every operation, and so winning the respect and confidence of the public. B.

THE RECORDS OF A DAY.

At eight o'clock we began the labors of the day upon a patient who had been victimized by an advertising practitioner. A few months previously he called at the *shop* where he had the stuffing done, and requested the dentist to examine his mouth. The report was that there were two cavities, one on the left superior first molar mesial surface, and the other in the second right bicuspid distal surface. The patient requested him to fill them with gold. The dentist reported that they were too far gone for that; that they were too weak to stand the pressure, and that the only chance to save them, was to fill them with amalgam, which he proceeded to do.

The cavities were only partially cleaned, but without any attempt to shape them properly, and a quantity of amalgam crowded down between the teeth, and the mouth pronounced in good order, and the patient dismissed. One of the masses of amalgam

was *lying around loose* between the teeth, and upon removing the other the cavity was found about half cleansed.

The cavities were carefully cleansed, chiseled into shape, dovetailing through in both cases to the grinding surfaces, and there was found to be no difficulty, as far as the strength of the teeth was concerned, in filling with gold. The patient is a wiser man, and has a higher appreciation of gold plugs than ever before.

Next, a young lady of eighteen, with mouth in a very bad condition. Two operators of this city have at different times filled some of her teeth. The operations of one of them, as I would have expected, have nearly all failed, whilst those which were placed in her mouth by the other are all good. The right superior second bicuspid has been treated for about ten days, and we find the pulp cavity ready to fill. No difficulty is experienced in filling the root, as the cavity is large and straight. As the labial cusp is almost entirely broken off, a question arises as to the propriety of building it up. The root is strong, as well as the lingual cusp, or at least what there is left of it, for a part of that is also gone. The patient shows her teeth but little when she parts her lips, so that the appearance of the gold can form but a very slight objection, and, upon the whole, I conclude to build up the labial cusp with gold. This is done during a somewhat tedious sitting of three hours. The tooth had been filled two or three times before, when the conditions for saving it were much more favorable than they were this time, but I have no fears of failure, in this case, for many years to come.

A new patient presents herself, and, upon examination, I find the old story over again. The left superior cuspid had been filled two or three times, "off East," as she said, and she showed very plainly that she thought her dentist *off East* could fill teeth as well as any one could. She seemed to be a little surprised when we answered her query in regard to the price, but, after some hesitation, made an engagement for a subsequent day, and we turned to another patient who had just entered, by whom we were requested to look at a plate, which had become so loose that it would scarcely stay in the mouth. The plate had only a single tooth, was of red rubber, and the mucous membrane was in an

active state of inflammation, and so much thickened that the plate was thrown entirely out of its original location. She stated that the plate set quite firmly when it was placed in the mouth, but after a few weeks, began to grow loose, and finally all the suction was lost, and the plate entirely useless. I recommended her to go without her plate, and to have the mucous membranes, where the plate rested, painted with tincture of iodine every other day for a month, and then call and see me again. J.

AN EXPERIENCE WITH THE MALLET.

By W. E. Driscoll.

Although the discussion of the mallet question is not as lively at present as a year ago, there can be no doubt that many remain to be converted to a correct practice in its use.

Having been so much benefited by the change to the heavy lead mallet, I am moved to suggest an idea in regard to the stroke, which I regard as next in importance to weight and non-elasticity. In fact as being in a great measure necessary to get the full benefit of the increased weight.

A great many, in using the heavy lead mallet, strike a quick, short blow. This, experience has proved to me, destroys, in a great degree, the value of this, the best of all the mallets yet devised, and is one main reason of the controversy as to what qualities constitute the best mallet. Without detailing the experience that leads to such a conclusion, I will say the best results that I have been able to attain to, with the mallet, was with one of lead, weighing nine ounces. Used with a slow stroke, swinging the mallet back and forth, a distance of about three inches, hitting square on the end of the plugger.

I am aware that there is an immense amount of eminent authority against this theory. But the question of what makes the gold work best cannot be settled by any amount of theory without the actual test of experience to prove every step. For this reason I could not have been induced to add another to the

long list of articles having for their object the defense of some pet idea of the law of "*vis viva*," "inertia," "momentum," etc., etc. What is really to be depended upon in such a case as this, is that which experience teaches. And, knowing what it has taught me, I would like to know if the same practice will not lead others to the same conclusion.

Mechanical and Miscellaneous Department.

PROCEEDINGS OF THE KANSAS STATE DENTAL SOCIETY.

TOPEKA, KANSAS, September 12, 1871.

Society met at the rooms of Dr. Marvin according to adjournment. President J. B. Wheeler in the chair. Roll was called, and Drs. Fuller, Wheeler, Marvin and Callahan answered to their names. Minutes of last meeting were read and adopted. The election of new members was next in order, and the names of A. Doud, of Olathe; L. C. Wasson, of Ottawa; F. D. E. Obert, of Topeka; and C. H. Reeder, of Burlingame, were presented by the membership committee, and after due deliberation they were elected active members of the Society, signed the constitution and paid the requisite fee. Society then adjourned to meet at nine o'clock to-morrow, at the parlors of the Fifth Avenue Hotel.

September 13, 9 o'clock.

Meeting called to order by the President. All the members present. Discussion on operative dentistry ensued.

Dr. Fuller said—I have been filling teeth for the last two years with foil. I use the hand mallet of lignum vitæ; have an assistant all the time. I have an automatic plugger, but use it very little, and prefer the hand mallet used by an assistant.

L. C. Wasson—I strongly advocate the use of Watt's crystal gold; have been using it for the last ten years; commenced its

use when first introduced; have used it with great success, and am quite sure that I can make a better filling with it than with foil. I know that a great many differ with me, and that the profession is generally opposed to its use; I think I can restore the lost heart of a tooth better, and more rapidly, and with the same amount of labor as used on foil; I have not replaced more than two fillings where I used Watt's crystal gold. Owe my success with crystal gold to my instructions in using it, by good operators and advocates of this form of gold. Think the trouble is with many operators, that they were not careful enough in its use. I use instruments with very shallow serrations. I have not a word to say against foil.

E. C. Fuller—I think if crystal gold is carefully worked with shallow serrated instruments, a good filling can be made with it. I confess that I do not know how to work it. I use heavy foil, No. 120, especially for building out lost portions of the tooth. I can work it nearly as fast as amalgam. I do not use 120 as much as formerly, but smaller Nos. of the heavy foil. Think it is not necessary to say much about amalgam. I use os artificiel for capping nerves; leave it for a few days in sensitive cavities to remove sensitiveness. In exposed nerves I fill with os artificiel, afterwards remove and fill with gold.

J. B. Wheeler—Would it not be better to leave some of the os artificiel?

E. C. Fuller—Yes, I always endeavor to do so; sometimes find difficulty in doing it. I think that new dentine is often formed.

L. C. Wasson—I have been using os artificiel for some time, with flattering results. Have seen a good deal about the formation of new dentine, especially in the reports of the Illinois Society. I do not think new dentine forms after the patient is twenty-five years old. I have had a case of exposed nerve filled with Hill's stopping; after six months removed and found new dentine formed. Have not had good success in capping nerves in the mouths of old persons.

E. C. Fuller—I do not think it best to remove the os artificiel in so short a time, but that it ought to remain for a year, if circumstances do not compel the hastening of filling with gold.

A. M. Callahan—I succeed with capping very well with young persons, not with old. With elderly people I destroy an exposed nerve and make a fang filling. Sometimes fail with young persons also. Many circumstances and conditions regarding the patient, influence the success of the operation of capping nerves.

A. Doud—I have not had much experience with os artificiel. Have used it some. In one case of nerve exposure I filled with os artificial; nerve was healthy; was compelled to remove the filling on account of pain. My experience is that the use of os artificiel is almost always accompanied with pain, often very severe and sometimes destroys an exposed nerve.

L. C. Wasson—The pain is generally saved by cauterization. Am careful not to put the os in, when in too fluid a state, else it will produce more pain than when put in thick and pasty.

E. C. Fuller—It requires considerable skill to insert an os artificiel filling. I introduce it so thin that it does not require dressing.

L. C. Wasson—I do not agree with Dr. Fuller as to the proper consistency of os artificiel when introduced. Do not think the fluid portion of the preparation amounts to anything.

Dr. Hewett, of Kansas City, being in attendance, was here elected an honorary member.

Dr. Hewett said—I have good success with os artificiel and use it in the same manner as Dr. Wasson does, and leave it in as long as it will last. I use the Eureka gold filling; it is much tougher than foil, and I prefer it to any other form of gold. Have good success in building out with it; use shallow serrated instruments.

C. H. Reeder—I have watched closely the interest in os artificiel. I use collodion on an exposed nerve before inserting the os, and recommend it highly. I am using M. M. Johnson's gold foil.

Marvin—I coincide with Dr. Wasson in regard to the use of sponge gold.

Wheeler—Have and am using os artificiel. I have a case of three molars exposed nerve and os artificiel filling. Have been in nearly a year, and I intend replacing with gold in a short

time over the zinc. A question with me is whether decay will be more likely to ensue with os artificiel as a filling over the nerve than with gold.

Fuller—I think, when possible, it is probably better to remove all the juice. I saw a case filled by Morrison, of St. Louis, where the os artificiel apparently softened the dentine.

Wheeler—I think such is often the case. In filling I use the rubber dam to a limited extent. The more I use it the better I like it. I made a failure with crystal gold; however, it may be the fault was mine; I have injured my practice with it. Do not like Morgan's gold.

Marvin—I used Lamm's gold but became disgusted with it.

Wheeler—I think that men in high standing in the profession did wrong in giving favorable certificates to Lamm's and Morgan's gold.

D. E. Obert—Can os artificiel always be used in exposed nerve? Is it advisable to use it after considerable pain has ensued by exposure?

Wheeler—Not always. I would ask Dr. Wasson if he uses Lamm's or Morgan's gold?

Wasson—I have never used either, but am very much pleased with the Eureka filling.

Wheeler—I always cap a healthy nerve, whether in old or young persons; I think it often dies with old persons, but in many of them the foramen is so closed that no harmful result ensues from the putrid matter engendering inflammation. A lady applied to have a tooth pivoted; the root healthy, some would have preferred building out with gold, but I decided to pivot. There was no sign of a pulp chamber; after drilling nearly to the end of the root I found a healthy nerve. I often fail with ulcerated teeth and cases of abscess. I think the hygienic treatment is not used enough. Have used creosote, iodine, carbolic acid, everything. Better let them alone so far as medicine is concerned, and cleanse better. I prefer, in superior teeth, not to stop the cavity; give it plenty of time; would not try to cure when scurvy is in the system.

Callahan—How do you get rid of pus in the lower jaw?

Wheeler—It is difficult. I have earned five dollars where I received one in such cases. I cleanse often and keep the cavity closed.

Patterson—I have paid considerable attention to this class of cases, and in practice have been generally successful. Enough so as to warrant a jealous perseverance to cure ulcerated teeth. Have not used the heroic treatment, rather the palliative and hygienic. In upper cases I do not close the cavity so that matter cannot escape from the root. A pellet of loose cotton in the cavity of decay will absorb any discharge and prevent unpleasantness in the mouth. I am very careful not to be in too much haste with filling. I have found cases—as you all no doubt have—that I could not cure so as to make it safe to fill in the usual manner, and I adopted a mode of procedure given in the *American Journal of Dental Science*, by J. S. Dodge, of New York. Cleaned out the cavity and roots thoroughly; filled the crown cavity and major part of the pulp cavity, leaving the nerve cavity and lower part of the pulp chamber vacant, and after completing, made an opening with a small drill from under the edge of the gum, into the unfilled portion of the pulp cavity, affording a passage for any matter that would accumulate. I have four of these cases, some of one year's standing, and the teeth have not given trouble; the discharge, if any, is not noticed. I have never seen but two cases where the heroic treatment of cutting the secreting sac from the root, with an instrument, was used, and the treatment in both cases failed; one of them was in my own mouth.

Wasson—In a case of ulceration of upper molar, I cleaned with tepid water, etc.; could not reduce the inflammation. I then introduced a tent through the fistula, treated with carbolic acid and iodine, and finally cured and filled with gold. It is now solid.

Society adjourned to meet at two o'clock, at the office of Dr. Callahan, for the purpose of witnessing a clinic by Dr. Wheeler, of N. Y.—the filling of a tooth with gold.

In the evening the Society met and discussed "Mechanical Dentistry."

Callahan — I am using rubber almost entirely as a base; put up a few cases of Watt's and William's metals, and one of Weston's metal. I prefer Watt's base to Weston's.

Reeder — Have used rubber with very good success. Some hold that rubber cannot be worn without detriment to the mouth. I do not think there is cause for such fears.

Marvin — I now never take an impression with wax, and get along very much better. Do not use metallic plates for upper cases, sometimes for lower. I sometimes load a lower rubber plate with lead; *heft* is very necessary in lower plates; make air chambers with lead. Some plates should have a deeper chamber than others.

Doud — Our process is much the same. I use tin for air chambers and coat my cast with liquid silex; take impressions for partial cases with wax.

Patterson — My process for rubber is much the same as others who have spoken. There is not enough attention paid to this department of dentistry, and I think there is, in inserting artificial teeth, room for the exercise of a higher talent than operative dentistry — only to a limited extent, however, when block gum teeth are used. I use the plain teeth whenever I can do so. Operative dentistry of course merits the first attention, as its aim is the preservation of the natural teeth. But replacing the natural organ when gone has not received the attention it deserves, and for that reason has been a fruitful source of charlatanism, and I think it is the fault of the profession that it is so. So long as we give so little attention to this department, we must not find fault with "cheap work;" because we generally *treat it* as cheap work. If the insertion of artificial teeth require no skill, no dental education, as many claim, then let us give it over entirely to mechanics and those who have no dental education.

Fuller — As far as I have used rubber it certainly has merits above other bases. I feel biased in favor of operative dentistry compared with mechanical. Am an advocate of the use of plain teeth; can articulate better with them. Do not believe in loading the rubber with lead. I like Weston's metal tolerably well; have never used Watt's.

Wasson—I use soap to separate. I do not think air chambers are necessary. I think operative dentistry is superior to mechanical dentistry. In making artificial teeth the process is the same in every case, and purely mechanical.

Wheeler—I have seen dangerous effects of red rubber. I think in many cases it is wrong to put it in. In a case where a patient wore red rubber, he complained of an itching sensation in the parts contiguous to the plate. I made a plate of black rubber for him, and the difficulty was entirely avoided.

Fuller—Have noticed ill effects from wearing a plate of red rubber. Do not know whether it was the effect of mercury or not.

Wasson—I think a plate of any material will produce ill effects. I do not attribute it to red rubber.

The discussion here veered to filling teeth with amalgam, and the practice was generally condemned. Tin was recommened to be used for cheap fillings.

The general interests of the Society was discussed at length, and the Society afterwards adjourned.

Next annual meeting at Atchison, May 2d, 1872.

J. D. Patterson, *Rec. Sec'y.*

MEMPHIS DENTAL SOCIETY.

We learn that this Society, which has lain dormant for a considerable length of time, has once more revived, and there seems now to be a determination to go to work and accomplish something in behalf of the interests of the profession. The society was formerly active, and we hope soon to hear from it again, and from what we know of the material in it we have all confidence that it will hereafter be among the *live* institutions of the land. We would remind our Memphis brethren that nothing is accomplished in this world without labor. Discussions, in societies or elsewhere, that have not been preceded and prepared for by thought, study and investigation, are usually of little use;

whilst carefully conducted experiments upon almost any subject usually lead to something that is interesting and instructive. We say therefore, not only to our professional brethren in Memphis, but throughout the world, Work! J.

From the Canada Journal of Dental Science.

"YOU MEAN ME!"

In the palmy days of the regime of Napoleon the Third, Victor Hugo made the following capital sarcasm, which can have numerous applications: "When the Paris Police overheard any one using the terms 'ruffian' and 'scoundrel,' they assume they must be speaking of the Emperor."

One of the special missions of this journal in Canada is to turn the current of thought and action towards a higher professional standing. It has endeavored steadily, without fear or favor, to maintain principles in accordance with this aim; to encourage every honorable sign of reform and aspiration, however humble or weak, and, with impartial vigilance, to expose the egotistical assumptions and falsehoods of "expositors" and the arrant impostures of quacks and "gutter dentists." Principles laid down in print have invariably been carried into practice, and even much personal private assistance has been given, to alienate and educate poorly qualified beginners from the dangerous attractions of open quackery. However, there are always barnacles as well as birds, and you cannot make a bird of a barnacle by giving it wings. It is just as natural for some men to be superficial and dishonest, as for barnacles to cling to a ship's bottom, and birds to play on its masts. The great aim must be to force such natures to turn their attention to some other sphere of labor where they can do less harm. In this age it seems that there must be a proportion of every population to fill the prisons, and the happiness of society would be greatly enhanced if dental quacks were less lucky in escaping their natural home. Any assistance this journal can give them, in facilitating their speedy

conveyance thither, will be afforded most cheerfully and without cost.

We are very happy to learn that by remarks made in this journal upon show cases, soliciting patients, and all such demeaning ways and means of obtaining practice, we have succeeded in making the lives of some notorious quacks miserable. For three years attempts were made to coerce them into honesty, but, in spite of the proverb, honesty was *their* best policy, because it was the best paying policy, and that it is the extent of their philosophy. Conciliation with quacks and Fenians is "played out," and we are as strong advocates for pillorying and punishing the one as for bayoneting and hanging the other; and when we use the terms "ruffian" and "scoundrel" *we do mean them.*

It is amusing, however, to find others appropriating these remarks to themselves, and fitting caps to their heads which were never designed for them. But just as truly as some can get well fitted with a ready-made coat instead of leaving their measure, so remarks made in a general way, will here and there find a bosom to nurse them; and it would be a sad pity for preachers if it were not so. We do not care one whit whether or not we lose subscribers by alluding to matters which to them may be disagreeably true. When this journal has to lose its independence we will print its obituary. The history of dental reform in Canada will only be a repetition of the history of dental reform elsewhere, and we calculated in beginning this journal to tread on tender toes and rub some backs against the grain. Dentists of common sense and honor in Canada, must see that unless we assume a state of perfection never yet assumed by respectable dentists elsewhere, reform must necessarily break down old barriers, and ruffle the tranquillity of minds, by abolishing unprofessional customs that may have almost become an integral part of our existence. B.

JOURNALISTIC.

The *Buffalo Medical and Surgical Journal* has an editorial upon "The Standard of Medical Education," in which the author takes a common-sense view of the subject, which should commend itself to the thoughtful consideration of all professional men.

He deprecates the idea, so prevalent at this time, that the schools are alone responsible for the low grade of intelligence which is too often found in the members of the medical profession, and argues that the main fault rests with the individual members of the profession themselves. He calls attention to the fact that many graduate at a school of some prominence among medical schools, and come to the conclusion that their education is complete, and as a natural consequence they neglect further study and research, and soon forget a great part of what they had learned during their collegiate course. He calls attention to the fact that the two or three years spent in *getting a diploma* suffices, under the most favorable circumstances, only to enable them to lay a good foundation, upon which it requires many years to rear a respectable superstructure which has any claim to be denominated a medical education. We fully coincide with the writer upon this subject. We are well aware that medical and dental schools are of the greatest benefit to students by shaping their course and pointing out the way, and should be held accountable for the non-performance of all their legitimate duties; but it is expecting too much from them to suppose that they can, in two or three years, change a blockhead or a plow-boy, or, indeed, a student of tolerably good literary acquirements, into an educated professional man. We have known students in medicine and in dentistry, who graduated with honor, who were really not as well fitted for performing their duties as practitioners, after twenty years' practice, as they were when they left the halls of their Alma Mater.

These drones in the profession are the ones who are a stand-

ing disgrace to it. They are ever making resolves to take hold and do something to retrieve what they see plainly has been lost; they are determined to commence *next week* a severe course of mental discipline and study; they are ambitious of attaining an honorable position in the profession, and they are well aware that it can only be accomplished by effort and study. Unfortunately for them, *next week* never comes; and they neglect one opportunity after another, till the shades of accumulating years fall slowly upon them, and then they come to the conclusion that it is now too late, and in a few years more the grave closes over them and they are forgotten, and the world is no better than it would have been if they had never existed. The man who puts off till to-morrow the commencement of his studies and investigations does so because he has not manhood enough in him to commence to-day, and he who has only manhood enough to make a few resolutions that he will do something sometime in the future, had better at once leave a profession that he can only disgrace, and seek some humble occupation where he can feel that he has a sufficient amount of knowledge, and energy and manhood to perform all the duties that devolve upon him. J.

The *Medical Record* of September 15th contains an article by Dr. C. C. P. Clark, of Oswego, N. Y., advocating the use of venesection in pneumonia and some other affections. It seems that the practice of bleeding, which at one time was undoubtedly overdone, is coming gradually into use again. We have never doubted but that, in the hands of careful and judicious men, it is capable of doing much good in the treatment of disease, and the sober second-thought of the profession will finally place it in its true position as one of the most efficient agencies employed in the healing art.

M. Broca, of the "Hopital de la Pitié," details a case of fracture of the leg, where the reduction of the fracture was strongly opposed by muscular contractions, which were easily overcome by *compression* of the femoral artery.

It is well known that muscular contractions present, in many

cases, the most formidable obstacles to a reduction of dislocations and fractures, and it appears, by the experiments of M. Broca, that compression of the principal artery which supplies the part suffices to obviate that difficulty. He has also found compression efficacious in other spasmodic affections.

We find also in the *Record* the following, from the *Gazette Médicale de Paris:*

"Tubercular Ulceration of the Mouth and Tongue.—M. U. Trélat, surgeon to *la Pitié*, describes these ulcerations, so commonly seen in the mouths of phthisical patients, as tubercular in their origin and not dependent on cachexia, as has been commonly supposed. He states that the persons affected are always tuberculous, and, in two cases which he has seen, the ulcers preceded any signs of disease of the lungs by seven and eight months respectively. It is the rule, however, for the inverse order to be the case. They may be found upon any part of the cavity of the mouth, cheeks, or pharynx, but the tongue is the most frequent seat. They are essentially chronic, and are progressive in their course, though rather indolent in the initial stage. They never retrogress spontaneously, and he has never known a person to recover from them. They are quite superficial, never having cavities on the one hand, nor the vegetations common to cancroid and carcinoma on the other. Their base is pinkish or yellowish grey, and they are covered with a very adherent mucous; are of irregular form, and, especially on the tongue, have an indurated base. The author considers the mode of development in the initial stage as quite pathognomonic of its character. There is found on the mucous membrane an elevated surface, round, and one to four millimetres broad, showing on its surface, which is still covered with epithelium, one or several follicular orifices. This spot is of a pale yellow color, resembling that of phlegnomous pus. At the end of a few days the epithelium becomes destroyed, and an ulcerated surface soon appears. Several may sometimes be seen in different stages of development."

The cundurango *speculation* promises to be active. The mere mention of the name of Vice-President Colfax, in connection with the drug, seems sufficient to give it a reputation which will induce many to pay enormous prices for it, and unfortunately, we are obliged to add, without any probability of being benefited by its use.

The *St. Louis Medical and Surgical Journal* for September is before us, and we have just spent some ten or fifteen minutes in cutting the leaves, which should have been done before it left the office of publication. Only think of the hours of valuable time consumed by the readers of this journal in cutting the leaves preparatory to reading! They are worth more money than the whole subscription price of the journal. Nearly all of the medical journals of the day, and all of the dental journals of this country, have corrected this state of affairs, so that one is not annoyed in this manner before he can take a look at the contents. The first article, by Wm. S. Edgar, M. D., upon "Cholera Infantum," gives a statistical sketch of the number of deaths from this disease in several large cities:—in St. Louis, during the last year, three hundred and seventy-one; in Boston, five hundred and twenty-one; whilst New York and Brooklyn show a mortality, from this cause alone, of two thousand one hundred and seven. The author says, in relation to its etiology, "We believe in a particular and indispensable factor, without the presence and force of which this malady is not produced; and that is a certain degree of solar heat *long continued.*"

He thinks "teething" has but little to do in the production of this disease.

In connection with this subject, the author states that he is informed by the clerk of the Board of Health "that seven-tenths of the certificates of deaths of infants under one year old are signed by ignorant midwives." We learn that this is a mistake; that no certificates of midwives as to deaths of children are taken at the office of the Board of Health, but that the clerk informed the author that seven-tenths of the certificates of still-born infants were signed by midwives, which places the matter in a very different light.

Referring to another part of this article, we find it stated that European cities are almost entirely free from this disease; and from tables of the mean temperature of cities in Europe and in the United States, we see that the temperature is eleven degrees, on an average, higher in the cities of the United States than in those of Europe.

The *Canada Journal of Dental Science* has for its leading article a communication, read before the Ontario Dental Society, on "The Advancement of Dental Science," in the course of which he observes: "Our art is a very ancient one. Herodotus, the oldest Greek historian, informs us that dentistry was practiced, long before his time, among the Egyptians, of whom he says, 'that the cure of the *teeth* was assigned to certain members of the healing art.' In confirmation of this, we hear at the present day of Egyptian mummies whose teeth are filled with gold." We have yet to learn of any authentic account of gold filling having been found in the teeth of Egyptian mummies, though we are aware that such statements have before been made by some writers on dental subjects. The article furnishes some interesting statistics relating to the early history of dentistry in Canada. Dr. Woolverton recommends a mixture of carbolic acid and oil of peppermint for controlling pain in alveolar abscesses. Dr. Raines, under the head of "Gold Plating on Silver Base for Artificial Dentures," says: "Finish a silver plate in the usual manner, remove all stains from soldering; fit the plate in the mouth; if all right, proceed—

"1st. Coat all the metal with quicksilver—plate, solder, and clasps.

"2d. Cut No. 20 gold foil into strips; use strip after strip until you have the plate covered; rub with a piece of chamois until the gold all disappears; add another layer of gold, and rub as before. You can put on the gold to any desired thickness.

"3d. Expose to a gradual heat until all the quicksilver is evaporated; polish, and you will have a rich gold surface."

In the *Cosmos* for September, Dr. McQuillen describes a case of paralysis of some of the muscles of the face, consequent upon an application of arsenic for the purpose of killing the pulps in an inferior bicuspid and a superior molar tooth of the right side. In spite of treatment, the inflammation around the teeth kept up until the offending teeth were removed, when the symptoms gradually disappeared.

Dr. Frazer, of Brooklyn, describes an "articulating guide,"

which he recommends for the purpose of assuring an exact articulation of the mouth by preventing the extrusion of the lower jaw whilst taking the articulation. It consists of a strap, properly padded, passed around the back of the neck and around the chin, where it should be properly padded.

The portion of the proceedings of the American Dental Association, published in this number, strongly illustrates to those who were present the fact that, to have any definite idea of what the proceeding of the Association are, one must be present at its meetings.

The *Boston Medical and Surgical Journal* has an item taken from the *Medical and Surgical Reporter*, which we give below:

"Tungstic Glue.—Tungstic glue bids fair to be an acceptable substitute for hard india-rubber, now so high in price.

"It is prepared by mixing a thick solution of glue with tungstate of soda and hydrochloric acid, by means of which a compound of tungstic acid and glue is precipitated, which, at a temperature of 80° to 140° Fahrenheit, is sufficiently elastic to admit of being drawn out into very thin sheets. On cooling, this mass becomes solid and brittle, and on being heated is again soft and plastic. This new compound, it is said, can be used for all the purposes to which hard rubber is adapted, and may prove to have valuable surgical applications."

The September number of the *Register* has an editorial upon "Crude Teachings," in which those who attempt to teach what they do not understand themselves are *slightly scored;* and another editorial, upon the importance of close "examinations," gives details of a case which had recently been observed in the office of the editor himself. A young girl had visited a dental office and had her teeth examined by a dentist of twenty-five years' experience, who assured her that they were all free from decay and in good condition. But as the mother of the young lady was dissatisfied with the first examination, the last mentioned practitioner was requested to examine them. He found

twenty-two cavities; and in four teeth the pulps were exposed. The cavities were mostly proximal.

In the *Nashville Journal of Medicine and Surgery* we find an allusion to the local anæsthetic powers of carbolic acid. We have alluded to this subject before, but it has been thus far but little used for this purpose; and the testimony in favor of its use seems to warrant a fair trial of it for this purpose. The part to be operated upon should be soaked with the strong solution of the acid for half an hour or more before the operation is commenced.

In the *Boston Medical and Surgical Journal* is the following extract from the *British Medical Journal:*

"New Test for Albumen.—Dr. C. M. Tidy has noted that a mixture of equal volumes of acetic and carbolic acids is a far more delicate test for the presence of albumen than any other method as yet proposed. In using this test with urine it is necessary to shake the test-tube, as some opacity is produced by the mere admixture of fluid, which, however, disappears on agitation."

The *American Journal of Dental Science* gives its first twelve pages to the report of the meeting of the Southern Dental Association, which was held last April in Charleston.

In a discussion upon treatment of children's teeth, filling was generally advocated. Dr. Hermon fills deciduous teeth with gold. Dr. Atkinson fills first with oxychloride, afterwards removes a portion, and fills with amalgam. Dr. Clark fills with amalgam; but, if very sensitive, fills with *os artificiel.*

The Missouri Dental Journal.

A MONTHLY RECORD OF THE SCIENCE.

VOL. III.] DECEMBER, 1871. [No. 12.

From the Boston Medical and Surgical Journal.

DENTIGEROUS CYSTS.

An Essay to which was awarded the First Prize of the Boylston Medical Society for 1871. By W. P. BOLLES, M. D.

This is not an affection which demands our time by its frequency or fatality. Yet its occurrence is sufficiently common to give its study practical interest, and, when present, it requires an intelligent interference to accomplish a cure. Coming, as this tumor does, in the most conspicuous part of the body, it not only encroaches upon the two great cavities of the face and impairs their functions, but thrusts out the lips or cheek, where concealment is impossible, to form an ugly and alarming deformity; and this, too, usually during a period when personal beauty is valued most highly. The surgeon who is familiar with this disease and can eliminate the various growths which simulate it, can promise to his patient not only life and comfort, but a restoration of comeliness. The chief interest of the disease, however, is not in the practical view just mentioned, but involves considerations which include also the structure and development of the organs affected. Dentigerous cysts owe their possibility to these elements, and are therefore peculiar to the jaws; they are extraordinary developments of cavities which, at a certain period of fœtal life, exist normally, and cover the teeth as they lie imbedded in the substance of the maxillary

arches; an abnormal action of the secreting power which these cysts possess, in fact causes the disease which we are considering. The cysts are not at all related in their nature to those cavities of other bones with which, until recently, they have been confounded, nor even with certain other cystic troubles of the jaws themselves, from which even now they are scarcely separated. The development of the parts concerned must, therefore, be studied before the disease itself.

Very early in fœtal life, before the human embryo attains an inch in length, even while the nose and mouth are still a common chasm, a thickening of the membrane of the maxillary arches forms a semi-circular ridge around their corresponding margins. The epithelium covering this ridge now proliferates, and along the summit of the ridge *several* layers of cells, instead of *one*, are found which indent the underlying substance, dividing the ridge into two ("dental ridges") by a shallow groove ("dental groove"). From the bottom of this groove a narrow epithelial fold grows deeply into the tissues beneath it, and is called the "enamel germ." These changes, according to the more recent observers, appear in the deeper layers of the epithelium, only, while the free surface is kept nearly in the same place by the accumulation of its cells. The enamel germ next widens at the bottom, and becomes divided into segments corresponding with the number of the temporary teeth. Each of these divisions, which are called "enamel organs," is somewhat flask-shaped and connected with the groove above by a narrow neck, the relic now of the enamel germ. A papilla, called the "dental germ," soon grows into the enamel organ from below, carrying, as it advances, the floor of the latter upon its summit; clothed with this it projects boldly into the "flask," invaginating its lower half, and there assumes the likeness of a tooth, with the enamel organ, now something of a "meniscus" in shape, resting upon its crown. The narrow isthmus reaching to the surface of the jaw then contracts and disappears, a vascular and fibrous envelop* sur-

*"Dental sac." Waldeyer, however, describes this as "richer in cells and vessels," and says that it disappears early.—Stricker's Histology, vol. i. p. 488 (Syd. Soc. Trans).

rounds the parts described, and is itself encompassed by the ossifying jaw. Thus the tooth is isolated from the mouth and from its fellows, and enclosed in solid bone in most close connection with an equally isolated epithelial sac.*

Those cells of the dental germ which lie immediately beneath its surface are next developed into a well-marked layer of bone-forming elements,† by means of which the dentine is produced, and soon forms a thin shell over the crown of the papilla, and increases in thickness, growing toward the centre of the tooth by successive layers of the same "odontoblasts."

Meanwhile, very great changes have taken place in the enamel organ. Its upper wall, but slightly altered, still consists of short and cubical cells. Its interior presents a web of stellate cells, converted from the accumulated epithelium, and widely separated in "a rich albuminous fluid." The layer enveloping the dentine would not now be recognized; its cells have become prismatic, regular and very long, their nuclei have advanced toward their superficial extremities (*i. e.* next the enamel pulp), their ends appear to be open. It is, however, continuous with the outer wall at its border, and the true epithelial covering of the remarkable papilla beneath it.‡ An intermediate layer§ of loose and rounded cells lies between this and the stellate forms in the middle. The enamel begins on the surface of the dentine by the calcification of these prismatic cells and increases outwards

* The object of nature in thus enclosing the dental organs seems to be to accomplish the formation of the enamel, for in certain fishes whose development does not extend beyond the "follicular" stage of Goodsir, dentine only, and no enamel, is found upon the pulp.—Owen, Odontography, p. 17.

† "Odontoblasts," Waldeyer. "Dentinal layers," Owen.

‡ Although it would be inferred from the older writers, and especially from every picture which I have seen, that the enamel membrane is not connected with the dental germ, yet it seems to me to be its own true epithelium, and that its free surface, properly speaking, is that which faces the enamel pulp; also that this latter is the only "cavity" in the dental sac. The interspace always figured between this membrane and the dentine is probably diagrammatic. If this be so, we have here the anomalous condition of a superficial membrane cut off from supplies below (by the hardening of the under-lying dentine) and nourished from its homologically free surface, that facing the enamel pulp.

§ "Stratum intermedium."

(in an opposite direction from the progress of the other), either by their elongation or successive replacement by the rounded ones next to them. Thus the growing enamel encroaches upon the enamel organ and is nourished by it.* The latter wastes as the other increases, and the tooth advances towards the gum, until finally, the pulpy part disappearing, its upper wall lies upon the surface of the enamel and hardens on it as the "cuticula dentis."—Stricker, op. cit. p. 485.

The cement is formed below the margin of the enamel by the ossification of the dental capsule. ("From the connective tissue of the dental alveoli."—Waldeyer.)

In the course of time the fang developes and elongates, the jaw and gum dissolve before the advancing tooth, and this at last appears in the cavity of the mouth.

From the inner side of the neck of each of the enamel organs which serve the temporary teeth, a second pouch is given off, which afterwards serves the corresponding permanent tooth in a similar course of development. There always remains, however, an unossified cord extending from this capsule, either to the gum or to the socket of the temporary tooth from which it sprung; thought to be a relic of the neck of the enamel organ†—a sort of umbilicus.

The first permanent molar is formed indepently from the milk set, the second from this by the budding process just described for the permanent teeth generally, and the third in like manner from the second. These in this respect resemble three genera-

*This is the view expressed by most authors; but Waldeyer says the office of the enamel pulp is only "transitory and mechanical;" to fill the cavity reserved for the tooth.—Stricker, op. cit. p. 485.

The "membrana præformativa," whose function, and even presence or absence, were for a time the cause of so much discussion and difference of opinion as even nearly to deprive the enamel cells of their traditional office, is, I think, best explained by Waldeyer as *the "youngest softish layer of the enamel," and not a separate membrane.*—Stricker, vol. i. p. 487.

† "Either because it is to become useful as a 'gubernaculum,' and its bony canal as an 'iter dentis,' or more probably in virtue of the general law that parts or organs which once acted an important part, however atrophied they may afterwards become, never wholly disappear, while they do not interfere with other parts or functions."—Goodsir, Edin. Med. Jour., 1838, p. 28.

tions of teeth, which, however, do not succeed each other, because the growth of the jaw at this place allows them all to coëxist.*

The growth and eruption of the permanent teeth are governed by the same rules as those of the temporary teeth; the process, however, is embarrassed and rendered difficult by the presence of the latter. The temporary alveoli are invaded by the new teeth; the temporary roots dissolve before them; and, at length, only a simple crown falls away and a new one has taken its place.

The jaws, therefore, during childhood, especially in its early part, are full of these remarkable organs in active process of growth, and crowded together in such apparent confusion that the wonder is that accidents to their development do not oftener occur—that the teeth are as regular as they are.

The literature of dentigerous cysts is meagre and unsatisfactory. Many of the older writers have failed to mention them at all, while the rest have hopelessly mixed their cases in a confused mass of "spina ventosa" and "osteo-sarcoma." Dupuytren mentions one undoubted case,† and several others which may have been such, but no reference is made to teeth in connection with them, except that one "was caused by the incomplete extraction of a canine."—P. 136. His directions for treatment, however, are excellent; better, in fact, than those of some more recent authors, many of whom have added nothing to his account.

Stanley quotes two cases,‡ besides others similar to those of Dupuytren; he follows him in pathology and treatment, but recognizes more clearly than he the distinction between cysts in the jaws and the various fluid cavities of other bones, yet fails to see the difference between the true dentigerous cyst and the one "caused by the irritation of a carious or misplaced tooth, and commencing near the extremity of the fang."—P. 300.

Warren gives some interesting cases (none, however, proved to be dentigerous), which he treated admirably and successfully,

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* But where they are unable to do so, the posterior may cause absorption and loosening of the anterior, as if it were merely its temporary predecessor.

† That of M. Loir. "Leçons Orale de Clinique Chirurgicale," Paris, 1839, t ii. p. 135. Also Appendix, No. 22.

‡ Diseases of the Bones. Also Appendix, Nos. 9 and 10.

part of which he considered to be due to trouble at the roots of certain teeth.* March relates cases similar to Warren's.† Jourdan (as quoted by Salter),‡ had three genuine cases. Other observers have each reported an instance, as may be seen in the appendix. Salter, in Holmes's Surgery, § has given the best account of the disease which the writer has seen, and has collected quite a number of cases for illustration, besides giving two from his own practice. More recently, Heath, || in his work on the jaws, devotes several pages to it, and gives three or four excellent drawings of specimens, but adds nothing new in theory or treatment.

The accounts in the common text-books are only compilations, and all inferior to those of the authors named. Glaswald is said to have written a very fine thesis upon it. It is not a little surprising so many errors should have occurred in the well written article ¶ of Salter, in which he describes two additional cases.

*Clinical History.***—This is, perhaps, the most neglected part in the recorded cases; many entirely fail to give the history of the case. Where it is given, it seems to be simple and easily told: a slow, nearly painless swelling of a portion of the jaw appears and increases, and a certain irregularity (to be referred to again) is noticed in dentition. What distress there is—usually slight, often none—is due to the tension and mechanical inconvenience of the new growth. In most cases this is all. The growth may be uniform and steady, or its progress may be retarded and again make fresh advances. It never diminishes. It may open in the mouth or through the cheek, causing either a per-

* Surgical Observations

† New York Medical Soc. Trans. 1856, pp. 163 and 164.

‡ Holmes's Surgery, vol. iv.

§ Ibid.

|| Heath on Injuries and Diseases of the Jaws.

¶ Guy's Hosp. Rep., 3d Ser., vol. xv., 1870.

** While the opinions of authors have been freely used in the following paragraphs, more weight has been given to the teaching of the cases themselves. On this account some of the following statements will be found different from the usual accounts, but a reference to the table will sustain them.

manent fistula, or it may close and open alternately. The wall of the antrum is usually compressed, rather than broken through; but this accident undoubtedly happens, and it often is impossible at the time of operation to say whether the cavity opened is the antrum or separate from it. Inflammation and suppuration often occur, but are not peculiar to dentigerous cysts. Such cases are apt to be painful. The size of the cavity varies from that of an orange, down.

The liability to cancerous degeneration is not so much feared now as formerly,* but that a fibrous growth occasionally follows has been observed in certain cases of cysts; it is doubtful however, if such cases were actually dentigerous cysts.†

Case No. 29, which occurred at the Boston City Hospital, in Dr. Thorndike's service, while the writer was his assistant, may be read as a typical example of the simple form of the disease. This, with Nos. 27 and 28, which occurred in his private practice, and No. 26, from that of Dr. Cheever, have not been published before, and are now presented with permission of these gentlemen.

There are certain cases accompanied by a considerable amount of pain, either from the very first, or coming on after a little, and lasting until interfered with. These either arise from a blow or injury, in cases where the errant tooth is pushing away obstructions to its progress, or such as are accompanied by some less usual complication.

The diagnosis requires, first, the recognition of a hollow growth, and, secondly, the knowledge that it contains a tooth.

* "Le marche des kystes ossieux est généralément lente. Au bout d'un temps plus ou moins long ils passent a le dégénérescence cancereuse, surtout ceux dont les produits sont fibro-celluleux."—Dupuytren, Leçons, &c., t. ii. p. 140.

† The prognosis, says Mr. Syme, is more favorable if a tooth be found in the cyst; it is then almost certain that it will contract and heal. This may occur in other cases, but it has been noticed that cysts, after being opened, are not unfrequently followed by the formation of a solid tumor. I could mention to you cases where I have opened cysts *containing nothing but serum*, in the place of which solid tumors have afterwards been formed.—Lancet, March 10th, 1855, p. 253.

The first is accomplished by physical examination, and would seem easy enough; yet a large proportion of the cases of removal of the bones for this disease were done through a mistake on this very point. The history of the case is not essential to this examination: yet an account of much pain, or cancerous tendency, would, of course, receive attention. An irregularity of its surface, polypi of the nose or pharynx, or fungus appearance, are indicative of a solid tumor. A painless swelling of either jaw, of not very rapid growth, should always suggest the possibility of a cyst, and lead to a careful examination of every part of its surface, both over *the cheek and within the mouth.** Fluctuations will usually be detected in certain places at least, although the greater portion may be bony and unyielding.† If these thinner spots be indented, perhaps they will return to their places with a crumpling sound which is pathognomonic of a cystic growth; if any doubt remain, an exploratory puncture, which is perfectly harmless, should always be made, as Dupuytren has well insisted:—"Je regarde une crepitation legére comme un symptome pathognomonique; ce signe merite beaucoup d'attention. S'il y a quelque doute on fait un ponction exploratrice; cette ponction et la crepitation, sont deux symptômes qui ne laissent aucun doute sur l'existence des kystes de cette nature."

The elimination of fluid accumulations in the antrum, old alveolar abscess or cysts containing blood, serum, or other matter, but not teeth, is more difficult. A decision from the above evidence alone would be impossible. There is one diagnostic mark, however, for these cases, which is of the highest value when it can be proved: this is *the absence of a permanent tooth* (which has never been removed) *some time after its appearance is due, in the neighborhood of the cyst, and whose place is quite likely to be filled by its temporary predecessor.* This condition in the

* "They are generally at some parts as hard and unyielding as the bone, so that if the examination be limited to these the mass will be supposed to be solid."—Syme, op. cit., p. 253.

† Judging from the *non-ossification of the old "gubernaculum,"* and the cases which I have seen, I shall venture to say that that portion of the wall under the gum where the *missing tooth should normally have appeared* will always be found *membranous or else very thin.*

mouth, in connection with the swelling, would be an almost positive indication of its nature. While, on the other hand, if all the teeth are present and normal, it is one of the other diseases.*

The predisposing and exciting causes of this affection should be separately studied. The presence of a tooth in the jaw which has never erupted is, in fact, the only one cause of the disease, since youth and other conditions which have been considered as such are only accidental. The teeth concerned are of the permanent set,† and usually delayed in the jaw, either in consequence of the irregular or non-development of their fangs, their deep situation, or wrong direction, or else of the obstinate persistence of the temporary teeth in advance of them.

The exciting causes are often unknown and probably various. The attempts of the impacted teeth to reach the surface have an exciting action in certain cases; but on the other hand such teeth may lay quiet in the jaw during the entire life, and cause no trouble, or may be found enclosed in a cyst after all attempts at growth had been given up for years. That the disease should follow the extraction or aching of carious teeth, is not remarkable, considering how common these are at all ages; yet such irritation in some cases may have been the exciting cause as well as the obstinate resistance of a milk tooth to the advance of its follower. In the first and second cases given in the tables the disease was evidently excited by the blows which preceded. The additional presence of undeveloped teeth in the jaw is, of course, essential in all these cases, for without these the affection *cannot exist.*

Whatever may have been the exciting cause, the pathology is essentially the same. The disease is due to a morbid secretion into and enlargement of the capsule of the enamel organ of the unfortunate tooth. This is shown by the position of the latter,

* Rare exceptions may occur to both these statements. Teeth may be indefinitely impacted or undeveloped, and yet produce no disturbance, or may be absent altogether—the missing member never having had an existence—or they may be the innocent participants of an independent growth, as where they become involved in solid tumors. A supernumerary and a temporary tooth have each been found at fault. (Appendix, Nos. 16 and 20.)

† One exception, No. 16.

whose crown lies exposed in, and to a certain degree faces the cavity. This position serves to distinguish this cyst from those instances where innocent teeth, before eruption, have become displaced by the growth of solid or even fluid tumors in which their own enamel organs bore no part, or other cavities which simulate it, but are as distinct from it as hydrocele from scrotal abscess. *If the fang instead of the crown project, it is not a true dentigerous cyst.**

Probably the reticular parenchyma of the enamel organ is destroyed by its expansion, but in the multilocular forms this may possibly aid in forming the partitions. The whole enclosure is lined with a serous membrane which is sometimes considerably thickened and vascular, and continuous over the crown of the tooth, as would be expected from its origin. A microscopical examination of such specimens would be very interesting; it should show an absence of the "cuticula dentis" from the tooth and the continuousness of its covering, the enamel membrane, with the rest of the wall. The fluid is usually serous, but may be purulent, contain cholesterin, flakes of lymph, or shiny matter, or vary in other respects. A bony exostosis in one case accompanied the cyst, and may have been the exciting cause of it. Other complications have occurred.

The prognosis, without treatment, may be inferred from the preceding pages. The influence of surgical interference will be seen from the following.

The aim of treatment should be to thoroughly expose the inside of the cyst to the air, to save the jaw if possible, and to leave as little disfigurement of the face as can be done. The cyst must be opened widely; no mere puncture is of any avail. A small hole will close before the secreting power is destroyed, and the disease will scarcely be retarded by the operation. In almost all instances the opening can be made with perfect ease within the mouth, and no scar left to reflect discredit upon the

* When, as is common, several teeth are enclosed in the same cyst, usually one is the *cause* of the trouble and the others are *sufferers by it*, and as unconnected with it as in the cases just mentioned. Thus, in Case No. 27 the second molar was the victim and the third the cause of the tumor.

surgeon. This is especially desirable if the patient be a female. The proper place for incision, particularly in the lower jaw where cysts always expand at the expense of its outer surface, will be found just outside of and parallel with the line of the teeth, but of course must be varied according to the indications of each case. Extracting a tooth and puncturing through its socket, as sometimes recommended in disease of the antrum, is inferior to the course just described, unless the cavity be small, or from the details of the case it is thought that its tooth can also be removed through the socket, or that it will take its place in the mouth by this means, when of course it is to be preferred. It is well, if the disease is extensive, to cut away a portion of its wall. By so doing its closing is prevented, the exposure more complete, and the application of dressings facilitated.

Many cases will get well by this treatment, without further attention; it is better, however, to fill the wound with lint or charpie, which will serve both to keep it open and maintain the desired irritation of the sac. The lint may be soaked with some stimulating wash with advantage in tedious cases, or tinct. iodine may be repeatedly painted or injected in addition. Dr. Warren insists, too, upon crushing together the walls at the time of operation; a practice which is certainly rational and would also aid in causing suppuration of the cyst. Attempts to scrape out the lining membrane have been made, but with indifferent success.* Methodical compression is recommended by several authors, with a view to promoting the cure and facilitating the return of the jaw to its original shape. It is usually not needed, however, as the tendency of parts to return to their normal forms after the disease which distorted them has been removed is sufficient in these cases. The pressure, too, must be disagreeable to the patient, and its actual effect very small. Some slight thickening or change of the bone almost always remains.

It has always been advised that the encysted tooth should be removed, but while generally desirable this is not essential, and in such cases as Nos. 4 and 26 of the table should by no means

* March. Transactions of the New York Med. Soc., 1856.

be done. Any persisting milk tooth in the neighborhood of one of these tumors should be at once drawn.

If one operation do not effect the cure let it be repeated, using every care that all the steps of it be *thoroughly* done.

In the course of healing the growth gradually shrinks, and the sac fills with granulations, the bone resumes nearly its original shape and size, the cavity is obliterated, and only a slight thickening remains. When the disease is very extensive, especially if its cavity be multiple or has repeatedly resisted the milder treatment, the removal of the affected part of the bone may be required. But it should be confessed that in many of the cases where the bone has been removed it has been done through an error in diagnosis. In one case, after the incisions for removal had been made, the surgeon, discovering with what he was dealing, abandoned his purpose and saved the jaw.

The details of the operation are not essential here, as they may be found in any work on surgery. In Case 29, two precautions were taken not usually mentioned, which, with the neatness with which it was done and its perfect success, make it a model to be followed when extirpation is needed. The external incision was made from the angle of the mouth *downwards* and backwards to a point nearly an inch and a half below the lobule of the ear; thus entirely avoiding division of the facial nerve and the consequent paralysis of the face. By this means, too, the most perfect drainage is obtained if needed, for as the patient lies in bed the direction of the cut is exactly vertical. Most of the periosteum was saved in the cases in question, and no vessel of any size cut but the facial and inferior dental. The bone was cut through the socket of the left lateral incisor, and the left side disarticulated.

The maintenance of the chin, undisturbed, is important, both with a view to preserving the features and of not impairing the tongue by cutting its anterior attachments. Of course, as little of the bone as possible should always be taken. This remark applies to the upper as well as the lower jaw, but in the upper the saving of the periosteum is less important, since its reproductive power is much less than that of the other.

The deformity produced by operation on either jaw is remarkably small. The whole superior maxilla may be removed and yet be scarcely missed, as is shown by the pictures of such cases, and in the instance just described of operation on the lower jaw the symmetry of the face was but little disturbed. In the lower jaw a stout fibrous or even bony cord will fill the vacant place, and enable the remaining part to perform tolerably well its duty, and even permit the patient to chew meat.* The recovery from the operation of removal is usually more rapid than that after the more conservative ones.

In the Appendix will be found a synopsis of all the authentic cases accessible to the writer, with the sources whence obtained. At first a much larger list was made and included many which were probably dentigerous, but where no mention is made of the teeth enclosed, the non-removal of the tumor making an accurate examination impossible.† These so much marred the accuracy of the table that they are now omitted, and none were retained but those expressly stated to contain teeth. There are one or two others which have not been included, because related with so few details as to be of no use.

The whole number of instances is too small for much generalization, but two or three facts are worth noting:—The sexes seem nearly equally liable (male 11, female 12). The number of upper and lower teeth affected is also equal. Most of the instances have occurred between the ages of 10 and 40:—1 to 10, one case;‡ 10 to 20, nine; 20 to 30, nine; 30 to 40, three; 40 to 50, none; 50 to 70, three. Their duration has been between four months and thirty years. The above list of ages is at the time of operation.

Contrary to the usual statement, but as might be expected from their position in the jaw, the lower third molars are the

* Stanley says the utmost extent of the reproductive power is the "fibro-cellular" cord firmly connecting the ends.—Diseases of Bones, p. 277.

† The teeth are sometimes altered in shape and often so little projecting as to be easily overlooked. In one specimen they were not discovered until it had passed through several able hands, and in another not for many years.

‡ And this is probably an error. See above.

teeth most frequently encysted, and second to these come the upper canines.

	Upper.	*Lower.*
Central incisors,	1	0
Lateral incisors,	3	0
Canine,	4	3
1st præmolar,	0	0
2d præmolar,	1	3
1st molar,	2	0
2d molar,	2	2
3d molar,	0	7

Supernumerary, 1; temporary molar, 1; "molar" (not stated), 2.

The specimens of Nos. 27, 28 and 29 have been deposited by Dr. Thorndike in the Harvard College Museum, and are typical instances of true detigerous cysts, No. 27 containing a large third molar of stout quadrangular form, with its roots fused into one long, straight, blunt fang. That of No. 28 is the right half of the lower jaw expanded into a multilocular cyst extending from the 2d præmolar to the caronoid and articular processes; about three inches long and five and a half inches in transverse circumference. The walls are bony, but filled with many roundish, irregular membranous spots. The other is the left half of the lower jaw expanded into an oblong rounded cyst from the tip of the coronoid and base of the articular process to the canine; it is larger than the other, being three and a half inches long and of about the same circumference. The second specimen was sawed off between the bicuspids and in the socket of the lateral incisor. Their other peculiarities are noted in the Appendix.

APPENDIX.

No.	*Sex.*	*Age.*	*History and Description.*	*Duration.*	*Teeth enclosed.*	*Treatment, &c.*	*Result.*	*Reference.*
1	Male.	14	Expansion of lower jaw as large as an English walnut, extending from near symphysis to anterior border of right masseter muscle. Gradually growing. Referred by patient to a blow upon the jaw. Believed to be solid by surgeon.	5 months.	Second right lower bicuspid; its fang aborted.	Opened externally, and its outer wall sawed away; found to be a cyst, with a thick vascular lining membrane, and containing a tooth, which was removed.	Complete recovery in 26 days.	Wormald. Lancet, 1850, vol. i. p. 756.
2	Female.	31	Swelling began, accompanied by pain and toothache, shortly after a severe blow upon the nose. Not relieved by the extraction of a tooth. Tumor reached from median line to first right upper molar, and from infra-orbital foramen to mouth. True nature not discovered before operation.	4 months.	Right upper lateral incisor and canine. The old roots occupying the places belonging to these were of the temporary set.	Tumor removed entire, and found to contain a yellow fluid and the crown of the lateral incisor. A second cavity, enclosing the canine, existed behind this one, lined with crystallized earthy matter. Contents glairy.	Recovery.	Mr. Syme. Edinburgh Med. and Surg. Journ. 1838, vol. 50, p. 381.
3	Female.	16	Cyst formed around second lower molar, which appeared perfectly healthy, and was at first in normal position, but afterwards became displaced and loose. Sense of distention and dull pain. Twice tapped, with temporary relief. Suppurated after second puncture. Contents serous at first.	9 or 10 months.	Third lower molar of lower jaw.	Second molar drawn, and the third found inverted between its fangs.	Rapid recovery.	Tome's Dental Surgery, p. 204.
4	Male.	22	Tense elastic swelling of left angle of lower jaw. Had previously been punctured, both within and without the cheek, unsuccessfully. Contained serum.	.....	Third left lower molar impacted in socket of second.	Cyst ruptured by extraction of second molar. Posterior fang of second greatly absorbed; third, which was impacted in its socket, and consequently exposed by its removal.	Recovery.	Salter, 1859. Guy's Hospital Reports, 3d Series, vol. v., p. 326.

No.	Sex.	Age.	History and Description.	Duration.	Teeth enclosed.	Treatment, &c.	Result.	Reference.
5	Female.	18	Elastic fluid tumor of left incisive bone, extending to the base of the nose. Teeth normal in *number*, but the left central incisor was of a *temporary character*.	.....	Crown of left central incisor projected into cyst. Direction normal. Fang abortive.	Both temporary and permanent incisors removed.	.....	Mr. Cock. Ibid., p. 325.
6	Female.	26	Dilatation of outer wall of right ramus of lower jaw, not accompanied by much pain. Growth gradual. Contents serous. Outline smooth.	2 years.	Molar (?) tooth found lying on the floor of the cyst.	Opened within the mouth, and a portion of its wall removed. Offending tooth removed.	Satisfactory recovery.	Guy's Hospital Reports, 1870, p. 258.
7	Male.	6	Serous cyst of gradual growth, encroaching on the orbit and mouth of left side, and projecting prominently forwards. Thought to follow a blow. Slight pain.	3 years.	Left lateral upper incisor inverted. Fang abnormal.	Opened within the mouth, and part of the wall removed. Crown of tooth found inverted and projecting into cyst.	Rapid recovery.	Ibid.
8	Female.	Young.	Serous cyst of left upper jaw, large as a pigeon's egg. Teeth of this side carious, and at times painful.	.....	Left upper canine transverse and very long.	Found to be distinct from antrum. Opened within the mouth. Compression.	Recovery.	Bordenave. Sydenham Society Transactions.
9	Male.	23	Cystic tumor, crackling on pressure, of gradual growth, and painless, on the outside of lower jaw, between symphysis and angle. Size of an English walnut.	3 years.	Inferior canine. Fang adherent to lining membrane.	Two thirds of wall removed. Lining membrane thick and vascular. Contents glairy.	Complete recovery	Mr. Earle. Stanley, Diseases of Bones, 1849, p. 269.
10	Female.	13	Large tumor in the cheek; nostril closed; arch of palate depressed; nose pressed to opposite side.	.....	Canine found lying in the bottom of the cavity.	Proved to be a cyst by puncture; freely opened into antrum, with which it was continuous. Fluid serous.	.....	M. Gensoule. Stanley, op. citat. p. 286.
11	Female.	17	Cyst of large size, encroaching upon antrum and nostril, producing great dilatation of this cavity and detention of this side of the face. Contents serous.	Months.	First and second right upper permanent molars inverted in cyst.	.....	.....	Jourdaine. Holmes's Surgery, vol. iv. p. 34.
12	Male.	60	Cyst, large as pigeon's egg, in upper jaw, closing the nostril of its side.	Many Months.	Second upper premolar deeply impacted in jaw.	.....	.....	Ibid.
13	Female.	13	A considerable tumor of one	1 year.	Lateral incisor	.....	.....	Ibid.

			of the intermaxillary bones filling up the whole "maxillary hollow."		monstrous; imbedded in intermaxilla, over and behind central.			
14	Male.	Young.	Great swelling in the substance of the upper jaw, with non appearance of the first and second permanent molars.	.....	First and second permanent upper molars inverted.	Freely opened. Cyst expanding into antrum. Contents serous.	.....	B. Cooper. Holmes's Surgery, vol. iv. p. 34.
15	Female.	38	Each antrum enormously dilated with a gradual accumulation of purulent fluid.	30 years.	Right upper canine. Left upper molar.	.....	.....	Bauin. Holmes's Surgery, vol. iv. p. 35.
16	Male.	Young.	Exostosis of upper jaw just below orbit, combined with a bony cyst containing a *temporary* molar.	.....	Second temporary upper molar [?].	.....	.....	Edwards. Holmes's Surgery.
17	Female.	13	Large hard tumor of left side of lower jaw, occupying its whole body. The teeth on this side had been extracted, save the second permanent and a temporary molar. Offensive discharge in mouth. No opening found.	6 months.	Left lower canine projected obliquely from the base of the cyst.	Thought to be solid. Jaw divided at symphysis, and left half disarticulated. Cystic. Purulent	Good recovery.	Yearn. Heath's Injuries and Diseases of the Jaws, p. 161, figs. 68, 69.
18	Female.	30	Tumor as large as a hen's egg, extending from the base of the coronoid process to right lateral incisor.	10 years.	Crown of right 3d molar projecting down. Fang in coronoid process.	Half of jaw removed.	Recovery.	Lisfranc or Forget. Heath, op. cit., p. 162, fig. 70.
19	Male.	56	Swelling in lower jaw, near chin, opening behind a front tooth. Discharge serous.	2 years.	Canine lay horizontally in the bottom.	Part of jaw removed.	Recovery.	Maissonneuve. Heath, op. cit., p. 164, fig 71.

History, Description, &c.

20	A capsule of bone as large as a chestnut (English), which had probably been filled with serum, rising up from the floor of the antrum and standing out free in its cavity. It contained one loose *supernumerary* tooth. No history. No external deformity.	Cartwright.
21	Portion of a lower jaw which had been removed, shown at the Odootological Society, containing a canine placed horizontally in the floor of a large cavity in its substance. No further history.	Tomes, op. cit. p. 191.
22	An osseous cyst in palate process of left upper maxilla, separating its compact laminæ, caused by an inverted canine, which had curved upon itself, and now projects into the cavity, with its root pointed out to the alveolar process. Cavity thrice the volume of the tooth.	M. Loir.
23	Dr. Forget relates the case of a woman about thirty, with a hemispherical tumor of right side of lower jaw, projecting mostly externally. M. Nelaton exposed it, and, making a hole in the outer wall, found a tooth [undoubtedly a molar] projecting into the cyst. The tooth was removed, and perfect recovery followed.	Nelaton or Forget. Heath, op. cit., p. 166, fig. 73.
24	In the Annali Univers. die Med., May, 1867, Sig. Battini relates a case of sub-periosteal and sub-capsular disarticulation of the lower jaw of left side of a woman aged 23, for what proved a dentigerous cyst in connection with the wisdom tooth.	Bothin. Heath, p. 164.
25	A central incisor of a young sheep was found attached to the side of a large cyst.	Holmes's Surg.

No.	Sex.	Age	History and Description.	Duration.	Teeth enclosed.	Treatment, &c.	Result.	Reference.
26	Male.	10 to 12	Cyst large as a hickory nut, enclosing 2d left lower bicuspid; second temporary molar present. Considerable pain. Purulent discharge in mouth; afterwards glairy. A second and smaller cyst, containing the corresponding right tooth, afterwards appeared.	.....	Second lower premolars.	Second temporary molar removed, and cyst widely opened; roots of the molar projecting into it. Bicuspid at the bottom; position good, not disturbed. The second cyst similarly treated.	Recovery. Both premolars took their place in the mouth.	Dr. Cheever.
27	Female.	70	Cyst in angle of jaw; had opened through the cheek, forming a sinus, which closed occasionally. Supposed to be necrosis. Fluid purulent.	10 years.	Third lower molar very large. One stout quadrangular fang.	Exposed through cheek. Its tooth found lying across the cavity, and removed.	Recovery.	Dr. Thorndike.
28	Male.	40	A very large tumor of the right half of the lower jaw, extending from the second premolar nearly to the tip of the articular process. At first painless, but afterwards subject to very distressing inflamed spells, which lasted a week or two. Said to have followed the extraction of a tooth. Second and third molars of this side absent.	8 to 10 years.	Second molar oblique, and nearly under the first in one of the divisions of the cyst. Third cannot be found in the network of partitions without mutilating the preparation.	The portion of jaw behind the first right premolar removed. Cyst multiple, bony, but covered with many roundish membranous spots, varying from one-eighth to five-eighth of an inch in diameter. There is one larger than the rest behind the first molar, indicating the place of the missing teeth. (See note above.)	Recovery.	Dr. Thorndike.
29	Male.	17	First noticed when as large as a bean, behind the lower left first permanent molar. Since then the tumor has gradually grown, until now it reaches from the articular process to the canine. Greatest enlargement external. Hard. No pain. Second and third molars of this side absent. Also the second premolar (which was probably pulled). Other teeth normal. Principal complaint of the deformity and impaired motion of the jaw. Fl. serous.	2 years.	Second molar lying on the outer wall of the cyst attached by its side, upright, perfect, but far from its proper place. Third in angle of jaw, facing the cyst. Not prominent; has no fang.	Reports two teeth to have been removed from this side a year ago, "which were succeeded by others." Jaw sawn through socket of the left lateral incisor and left half disarticulated. The walls of the cyst are bony, except a large membranous spot behind the first molar, where the second and third should have appeared. (See note above.)	Recovery in three weeks, so as to chew meat. Deformity very slight.	Dr. Thorndike. Boston City Hospital.

Operative and Surgical Dentistry.

THE RECORDS OF A DAY.

Patient, aged 42 years, in good health, teeth yellowish, tolerably hard, but a little inclined to be brittle. Have had the mouth under treatment about three weeks. Found the lingual surfaces of the inferior incisions and canines coated with salivary calculus, gums absorbed and presenting, as is usual in such cases, a red inflamed margin, where it comes in contact with the accumulated tartar. The left inferior second bicuspid and first molar wanting, and superior left first bicuspid, likewise. The right superior left canine had been filled on distal surface. The cavity was large, and upon touching the filling with an excavator, the gold fell out, revealing the pulp cavity open. The patient stated that she had noticed a disagreeable taste, for two years, in the vicinity of the tooth, and I had no doubt but that it proceeded from the canine. The inferior left second molar had a large cavity, involving the mesial surface, and extending through to the grinding surface; and placing an excavator upon the margin of the gold, it fell into a cavity between the filling and the lateral wall of the cavity. The surface of the filling appeared more like the surface of a grater, than like a properly formed gold filling. With my excavator, I turned out the filling, and found the dentine softened and decaying over a great part of the walls of the cavity. Five or six other cavities were found in a similar condition. The tartar was carefully removed from the teeth, and the gums slightly touched with tincture of iodine, care being taken not to introduce a large quantity at a time, as it spreads rapidly, and covers parts where it is not needed. The canine was treated with creosote for some ten days; the root having been carefully cleaned out, the pulp cavity and crown cavity were filled with gold. A few days after filling the bicuspid, the lady called again, and still insisted that

she tasted something escaping from the tooth which had been filled. A closer examination revealed a cavity in the lateral incisor distal surface, which had hitherto been completely masked by the close proximity of the canine. Upon separating the lateral incision and canine, and passing a broach into the cavity, it was found that the pulp canal was open, and a large amount of pus flowed freely from it. I had before observed that the alveolar process, upon that side, was considerably thicker than the other, and that there seemed to be a little sponginess of the gums and mucous membrane, for a considerable distance around. The cavity of the abscess must have been large, as nearly a teaspoonful of pus escaped at one time. There was no soreness, no external fistula, and the tooth had given no pain, at any time, as I could learn. Creosote and tincture of iodine were forced into the cavity, as far as possible, and after a few applications, the discharge decreased, and finally stopped. The whole was then filled with gold, and the "bad taste in the mouth" has disappeared. This abscess had existed for several years, and as a consequence of the continued irritation of the parts, there had been produced hypertrophy of the periosteum and mucous membrane, for a space extending at least an inch long and half or three quarters of an inch broad upon both sides of the process, and, perhaps, a thickening of the process itself. Painting the parts two or three times a week with a strong tincture of iodine, will probably reduce the thickness of the parts, to some extent; but the thick clumsy appearance of the alveolar process will probably not entirely disappear.

Another patient presents herself, and, upon examination, I find three cavities, which have been filled with oxy-chloride of zinc. A large amount of heavy gold work, in this mouth, showed, very conclusively, that she had been no stranger to our fraternity, and the character of the work showed likewise that she had not been in the hands of cheap dentists. She pointed to a central incisor, which, she casually observed, cost her fifty dollars to have filled; but there was no complaint of the price, as the filling seemed to be doing its work well.

The three oxy-chloride fillings had not answered so well. One

of them had entirely disappeared, and the other two had nearly all washed out. One of the teeth was aching—the one where the filling was all out. Two of these cavities were in locations where it would have been extremely difficult to fill with gold, and the third one, though difficult, would not have been more so than many cavities that are daily well filled with gold. This accords with our general experience with oxy-chloride fillings. These had been in about six months. After cleaning out carefully the cavity in the aching tooth, I applied creosote, and the pain soon stopped; and, after a few days of treatment, I propose to cap and fill the cavity.

Next, a case of absorption of gum and alveolar process of left central incisor, the disease extending but a short distance beyond, implicating slightly, however, the left lateral. I cauterized the edge of the alveolar process, high up, under the gums, with chloride of zinc, and direct my patient to call again in two days. A man, with his face upon the left side badly swollen, so that the jaws could not be separated more than half an inch. He had applied to a practitioner a day or two before, but was told that it was impossible to extract his tooth, which was manifestly the cause of his trouble, as he could not open his mouth. The tooth to be extracted was the left lower sapientia. I drew back the angle of the mouth, and forcing an elevator between the sapientia and second molar, soon relieved him of the offending member. No further treatment required. J.

THE PERKINS-HYATT OR CELLULOID BASE.

In the April number of the JOURNAL, of the current year, we called the attention of our readers to this new base, and published, as an item of interest, the circular issued by the patentees, adding a word of caution against a too hasty adoption of what was then an untried experiment. Sufficient time has now elapsed to prove, we think, the utter worthlessness of this material as a base for artificial teeth, and agreeable to a promise

made when we took up the editorial quill, we publish the following list of experimental cases with this base, with the results, as our own experience, and upon which, in part, we base our opinion of its merits.

Case No. 1. Mrs. P., full upper set gum teeth; returned in three weeks, so badly shrunk that the heels of the plate would not pass over the plaster model by one-eighth of an inch. The bicuspid blocks, on both sides, drawn inwards, so that the upper edge of the gum was entirely out of the socket formed by the rim of the plate above the blocks. Color of plate, pink. Put up in boiling oil.

No. 2. Mrs. H., full upper plate plane teeth; returned in two weeks, shrunk so that the plate would not touch center of the palate by one-fourth of an inch. Softened the plate and readapted it to the plaster model. Returned in one week, worse than ever. Color of plate, dark brown; boiled in oil. Plate inserted immediately after extracting the natural teeth.

No. 3. Mrs. H., full upper temporary set; returned in two weeks, so much out of shape, that it could not possibly be worn. Color of plate, pink; boiled in oil.

No. 4. Mrs. R., full upper and lower set; returned in four weeks, shrunk so that it was impossible to wear them. The heels of the under plate one-fourth of an inch nearer each other than when first made.

No. 5. Mrs. E., full set of upper and lower gum teeth; returned in three months, all drawn out of shape; the under teeth drawn inwards, throwing the edges of the gum out of the rim, and the plates so curled up that the posterior molars would not articulate by at least one-fourth of an inch. The worst case of shrinkage and twisting in the lot.

No. 6. Mrs. R., full set upper and lower. Put up in June, is still worn, but a very poor fit. Color, light pink; boiled in oil.

No. 7. Miss L., full upper temporary. Put up in June; still worn; plate without any coloring material. Translucent.

No. 8. Miss I., full set upper; returned in three weeks. Made a new plate of the improved material; returned in six weeks, entirely out of shape.

No. 9. Miss K., upper set; put up in May; returned in six weeks. Made a new plate; second plate returned in eight weeks, worthless.

No. 10. Mrs. E., full upper and lower gum teeth; made in June; returned in three months; blocks out of place and the plate all out of shape.

No. 11. Miss C., partial plate; returned in three weeks, worthless.

No. 12. Miss I., partial; returned in four weeks, worthless.

No. 13. Mr. H., full set; made in June; returned in four weeks; second plate of the improved material returned in six weeks, worthless.

No. 14. Mrs. B., full set temporary; returned in four weeks, worthless.

No. 15. Mrs. B., full lower set temporary; made in May. Still worn, but badly out of shape.

Ten other cases, returned as worthless.

We think comment on the above record unnecessary; it speaks for itself. Of all the cheap materials which have been palmed off upon the profession, as bases for artificial teeth, this is undoubtedly the poorest.

We have tried the different qualities of this material, and find but little difference in the result. The plates having the least camphor combined with them being undoubtedly the best; but they all contain too much of this element. Unless the manufacturers can overcome the shrinkage and warping of this material, it can be of but little use.

In the last number of the *Dental Cosmos* may be seen a full page advertisement, recommending very highly the celluloid base, and stating emphatically that all objections urged against it have been overcome. We have received plates, since this advertisement appeared, that do not differ materially from those manufactured three or four months since.

'Tis said, there are tricks in all trades, and this trick of puffing, by means of circulars, purporting to be issued by disinterested parties—men well known to the profession—and solely for the benefit of brother dentists, who are supposed to be anxious

inquirers after truth, and by laudatory puffs and flaming advertisements, in our dental journals, is one with which our profession is largely cursed at the present day, and one which has cost many a poor dentist, living remote from our large cities, dollars for which he has received no benefit. We know how it is ourself.

EAMES.

Mechanical and Miscellaneous Department.

From The Dental Cosmos.

NITROUS OXIDE INHALERS.

By A. J. REDERICK, Sioux City, Iowa.

In administering nitrous oxide gas with any of the inhalers in use, I have noticed a difficulty in breathing, manifested by the patient opening the corners of the mouth—not grasping tightly the inhaler. This occurs in patients of large, healthy, strong lungs, where the capacity for full inhalation is good.

By enlarging the holes of the valves with a burr drill, so as to produce a capacity greater by fifty per cent., the difficulty, to a certain extent, is remedied,—but not enough to admit free, full, and natural respiration. Another objection to inhalers for oral surgery (I think a great one) is the necessity of using the mouth as the medium for conveying gas to the lungs. There is difficulty in excluding atmospheric air when a cork is placed between the teeth for keeping the jaws apart, or opening the mouth when anæsthesia is induced where no cork is used. The time lost in reapplying the inhaler, when a number of teeth are to be extracted, is also an objection, considering the transitory nature of nitrous oxide.

By dispensing with the mouth these last difficulties can be overcome; by making valves of greater capacity, the first will be met.

With these objections and difficulties in view, I constructed

two valves of a capacity three times greater than the ones in the old inhaler; also a tin tube seven inches in length, and seven eighths of an inch in diameter; placed the inhaling-valve at the end, which is inserted into the tubing leading from the gasometer (I give gas direct from the gasometer), and the exhaling-valve about three inches back of this into a tube mounted upon the main tube of about equal capacity. The rubber used for the valves which answers perfectly to the demand is a piece of Barnum's rubber dam.

The inhaler, at this stage, admits free, full, and easy breathing; no gas is lost, as the capacity is not too great for perfect working of the valves. This remedies the first objection.

To remedy the second, I soldered at the mouth end two tubes, each one inch and a half in length and half an inch in diameter. These were placed into the main tube by slightly flattening the ends. Rubber tubing is placed on each of these tubes. In administering the gas, place one of the tubes into each nostril. By flattening or doubling upon itself it will readily enter, and upon resuming its shape through the force of its elasticity, will effectually close the nostril, even distending the alar fibro-cartilage and its appendage.

The inhaling-valve is closed or opened by means of a tube sliding back and forth inside of the main tube. In extracting a number of teeth the inhaler need not be removed when the patient is under the influence of the gas; but the valve should be closed until the anæsthetic effect is passing off, when it should be opened and the mouth closed with a napkin held by the hand closely, to exclude atmospheric air; proceed to extract until the effect passes off, when you again open the valve, close the mouth, and readminister gas. Very little gas is needed in these intervals.

Such is the construction of the inhaler I have been using over three months. I shall make one of silver, and, should any improvement in the shape of the nose-piece suggest itself (I think if they were bulbous it would be an improvement), I will take advantage of the suggestion.

Any hints from professional brethren will be acceptable.

A POPULAR DENTAL JOURNAL.

The necessity for diffusing more light on subjects connected with dentistry, among the people, has long been acknowledged, and various methods for accomplishing this has been suggested, and not unfrequently acted upon by individuals; but no well digested, concerted plan of proceeding, in this direction, has yet been accomplished, though many periodicals and books have from time to time made their appearance, which were ostensibly designed to effect this purpose.

The influence of these publications has been limited hitherto, because they were objectional, as a general thing, to the profession at large, in that they have, for the most part, inured specially to the benefit of the authors, rather than to the people and to the general profession.

In order that anything of this kind shall achieve a decided success, two things are evidently necessary.

The contents of such a work must be carefully selected, and nothing admitted in its pages but what would receive the unqualified assent, as to its correctness, of a large majority of the intelligent masses of the profession; and, secondly, it must be so managed that no one connected with its editorial department shall receive any advertisement, or other advantage, which it it will not also afford to every honest member of the profession.

To meet this want, and also with special reference to these two propositions submitted above, the task has been undertaken by the St. Louis Dental Society, for the present, though it is probable that the State Society will be solicited to take charge of the enterprise, at its next meeting. It is proposed to print a monthly journal of eight pages reading matter, under the auspices of the society. No name is to appear in its pages, either as editor or author, and no article shall appear which has not been endorsed by a vote of the St. Louis Society. The price of the journal will be fifty cents per year, in advance. It is expected that every dental practitioner will find it to his interest to see to it that his patrons become subscribers.

The leading practitioners of the city have subscribed for from ten to twenty copies each, and we have no doubt but that many of them will find it to their interest to considerably increase their subscriptions. These subscriptions will doubtless, for the most part, be placed easily to the account of their patrons, through their recommendation; but in exceptional cases, they will perhaps think that their interests and the interests of their patrons will be both subserved by sending the journal to the latter free of charge.

It is intended that the first number of "The Popular Dental Journal" will make its appearance in January, and as it will be just as valuable, as a means of educating the popular mind, to distribute in Maine, California, or Texas, as in Missouri, we hope to obtain subscriptions from every quarter, where the profession feel that it is desirable that the public should be enlightened upon these subjects.

Subscriptions may be sent, at present, to the "Missouri Dental Journal," 819 Locust Street, St. Louis, Mo. We commend this enterprise to the favorable consideration of the profession. J.

We are pleased to note the fact that some of our dental societies have already commenced the organization of their forces to fight the Cummings' patent in 1872. The bugle call to arms has been heard; and we trust that all, from the east and the west, the north and the south, will rally round our standard, prepared to fight till victory be ours. "In union there is strength." Let there be harmony of action and a union of effort in this struggle, and the cost to each individual member of the profession will be but a mere trifle. It is the opinion of the best legal authority in St. Louis that the fact of the Goodyear Vulcanite Company having issued licences to dentists to use vulcanite rubber for dental plates, more than thirteen years since, destroys all claims of Mr. Cummings to a patent issued long after these licenses were granted by the Goodyear Company. E.

JOURNALISTIC.

The *Cosmos* for November contains an article by A. J. Roderick, upon "Nitrous Oxide Inhalations," in which an apparatus, fitted for inhalation through the nostrils is recommended, instead of the common mouth-piece. For this purpose rubber tubes are inserted into the nostrils, instead of making use of the apparatus covering both nose and mouth heretofore used for this purpose, and which is familiar to most of our readers. The author also advocates the use of inhalers and tubes of greater calibre than those usually employed.

A short report of the "New Jersey State Dental Society," indicates that the Society is in a flourishing condition, seventeen new names having been added to its list of members at its last meeting. Preliminary steps were taken by the Society to secure the passage of a law to regulate the practice of dentistry in that State. During the discussions several sensible objections were made to the use of the celluloid base.

Dr. Colburn does not use the rubber dam, because he *gets along perfectly well* without it. We can understand very well how this "getting along perfectly well without it" is accomplished. It generally indicates that the operator is accustomed to go around difficulties rather than surmount them. We have in view of such a "getting along" a clear appreciation of doctrines and practices that do not mark the skillful and honest practitioners of this day, and we imagine cases where amalgam is much *better* than gold, and these cases are apt to be found whenever there is the least difficulty to be surmounted in filling with gold. Such practitioners are sure to degenerate into first class tooth carpenters, and the quicker they understand that this is the inevitable tendency, and reform their practice, the better for themselves as well as for their patients.

In the report of the "East Tennessee Dental Convention" we notice that resolutions were adopted looking to the establishment of a dental school in connection with the Nashville Medical

College, and that Dr. Morgan was recommended "as the most suitable person to fill the chair of Operative Dentistry."

Under the head of "Bibliographical" we have a somewhat lengthy notice of Dr. Arthur's new work upon the "Treatment and Prevention of Decay of the Teeth." The work recommends what we would call heroic filing, not only where caries actually exist but in many cases as a precautionary measure to prevent decay.

Although we do not predict that any large proportion of the profession will adopt the extreme views of Dr. Arthur, still the work in question cannot but exercise a very considerable influence upon future practice, as many will be found using the file much more freely than they have heretofore, and perhaps with benefit to their patients. Experience will probably determine in favor of a freer use of the file than at present obtains, but to what extent our practice will be modified in this direction time alone can tell.

An extract from "Odd Hours of a Physician," by John Darby, gives us a very attractive and simple theory of what a *cold* is, and the philosophy of its treatment. According to this author, colds or inflammations are only dependent upon derangements of circulation produced by an exposure, by which the small vessels are so contracted that the blood is forced upon the internal organs, and the weakest organ becomes the principal one involved in the congested or inflammatory condition. Whilst the organs having a greater vital activity have been able "to contract upon and drive back the current intruding upon them."

We have only one objection to this exceedingly comprehensive theory, and that is that it is not based on a sufficiently firm foundation to warrant us in adopting it as the true theory of inflammation. In fact, it does not require any very extended examination of this subject to convince any competent and careful observer that this is not by any means a complete explanation of the philosophy of inflammatory action.

The *American Journal of Dental Science* opens with an article by S. P. Cutler, of New Orleans, upon the "Microscopy of the

Teeth," in which *macroscopical* rather than microscopical appearances are for the most part discussed.

We have looked in vain for any evidence of new discoveries in the microscopic appearance of the teeth, in this article, unless it be claimed that the closing up of the canaliculi and dentinal tubuli, in advanced age, may be classed under that head. Whether this has been as broadly stated before or not, it is pretty certain that the opinion that this process does take place, as stated by this author, has been prevalent for many years, and its truth has long been recognized by the profession.

The second article is upon "Dental Therapeutics" and by F. Y. Clark, of Savannah, Georgia. Dr. Clark commences his dissertation by some allusions to the causes of decay, as laid down by the older authors, no notice being taken of some of the later theories upon that subject, such as Coleman's electrolytic theory, or that of Wedl, of a later date still.

The author recommends filling the deciduous teeth, and their retention as long as possible, which will be generally recognized as sound doctrine by most dental practitioners of this day. This idea, however, is not exactly in accordance with the opinions of all the physicians of the day, as we were but yesterday consulted by a lady of this city, in reference to the teeth of her daughter, who is eight years of age. The lady said she had taught the little girl to brush her teeth carefully and keep them clean, but her physician had told her that it was wrong to do so, as it would make them *last* too long, and, from the conversation, it was clearly evident that the wise doctor supposed that the deciduous teeth were always lost by decay, and that if they did not decay away, the second set would not make its appearance. We will, however, state that the physician was not a graduate of a regular medical college.

Dr. Clark notices and indorses the doctrine promulgated by Dr. Arthur, of Baltimore, in relation to filing the proximal surfaces as a prevention of decay in certain cases, and as a remedy when caries has already commenced. We do not agree with the author in indorsing this practice. Nearly as objectionable as the above, is the line of practice indicated below: "When teeth

are predisposed to decay between in young persons' mouths, we are in the habit of extracting one on each side, upper and lower."

The queries which he asks microscopists to answer are very pertinent, but we are not convinced that his method, as described by himself, of making specimens for examination are the best yet devised. He says, in examining saliva for parasites:

"The simplest way to see these * * * * is to take two or three little object glasses * * * * and run the edge of one after the other over the tongue, lightly scraping it, etc."

We would suggest that, upon a glass slide, the specimen would be in a much better condition for examination than upon the *object* glass.

After condemning the indiscriminate extraction of teeth in nitrous oxide extracting establishments, and the use of rubber plates, he concludes as follows:

"This being the case, we must say that the various anæsthetics, and the use of rubber, have proven a curse rather than a blessing, for they have been the means of sacrificing millions of teeth, which we are now sure could have been saved."

The *Pharmacist* for October has a short editorial upon the recent meeting of the American Pharmaceutical Association, from which we take the following:

"A delegation from the University of Michigan presented itself for admission, as representing a college of pharmacy. It being shown that the University confers the degree of 'Pharmaceutical Chemist' upon young men who have had no experience whatever in the drug business, and who, consequently, have no knowledge fitting them for such a title, the application was rejected."

We wish to call attention to the charge here made against the Michigan University, *i.e.*, that it confers degrees upon young men who have no knowledge fitting them for such a title.

This body of men, collected from all parts of the United States, as well as from Canada, and we believe a few from the Old World, were not actuated by any petty jealousy or other improper motives, in refusing to admit the delegation from the Michigan University.

We are glad that notice is being taken of the practice so prevalent in many institutions of learning, of conferring degrees upon those who are totally unfitted to occupy a place in the profession or calling, into which they are unceremoniously inducted by some institution, which has the *power* conferred upon it by some legislative enactment of conferring degrees.

If public opinion is directed to this subject, as it should be, how long will it be before diplomas from such institutions will be a disgrace to any one who is unfortunate enough to have one in his possession. A diploma at this day, from any institution, which has not been gained by attendance faithfully given to the prescribed course of study is no recommendation to the one who possesses it, and it is far from being a credit to the institution which *sells* it. If we do not misinterpret the signs of the times, diplomas *of that kind* will not be exhibited as *ornaments* in offices much longer, but will be quietly stowed away where they will not be so liable to suggest troublesome interrogatories.

We do not intend to censure institutions who have been in the habit of conferring degrees without a faithful attendance upon the lecture course, as this may have been excusable in the past, but we do claim that it is now time to make a diploma an evidence that a thorough course of study has been pursued by the graduate, and likewise that he has profited by the instruction.

In the *Register* for October, we have a paper read before the Mad River Dental Society, by Prof. C. M. Wright, in which the writer recommends a return, to a certain extent, to the old fashioned methods of filling teeth with soft foil, arguing that much time can thus be saved, and that the operation can in many cases be performed with much less discomfort to the patient.

Whilst this subject is before us, we would say that when one has so perfected himself in the use of adhesive foil, that his operations are faultless, it will then be time to give more thought to the *saving* of time in filling teeth. Soft foil, however, has its place in this operation, and in the shape of cylinders especially, skillfully manipulated, with cavities fitted for such operations, serves an excellent purpose.

A case of caries of the jaw bone in connection with abscesses of central and lateral incisor teeth, is reported by H. L. Sage. The case was treated by scraping away the diseased bone, and applying a solution of chloride of zinc, tincture of iodine, creosote, and finally, with aromatic sulphuric acid.

The fangs of two teeth were denuded, and although there was a loss of a considerable portion of the alveolar process, extending nearly an inch in length, the case progressed to a favorable termination, the roots of the teeth being covered entirely over with new tissues, and the teeth remained firmly in their places.

The *Boston Medical and Surgical Journal* of September 28th, has a report of a case of cancer of the breast treated with cundurango. The medicine seemed to produce rather marked beneficial effects for a short time, when worse symptoms again made their appearance, and the patient sunk and finally died. The case was probably one of true cancer, but it seems that no microscopic examination was made of it. The symptoms which followed the administration of the medicine were mainly those that might have been anticipated from the administration of a vegetable tonic, and from what little light we have at present, it seems probable that cundurango will finally take its place with quassia, gentian, and others of this class, and will perhaps stand at the head of that class of remedies, but we have no reliable information yet, that would lead us to anticipate any special benefit in its use as a specific for cancer.

Dr. Harvey, of Janesville, Wisconsin, reports a case of convulsions in a child two and a half years old. Purgatives, cold to head and other antiphlogistic remedies were used without benefit, but upon the admistration of chloral hydrate, two and a half grain doses every hour, the child rapidly recovered.

The October No. of the *Zahnarzt* contains a part of the report of the transactions of the Central Society of German Dentists, held in Berlin in August last. President Süersen made a report upon wounds accompanied by fractures of the jaw bones. He had treated fifty-two cases of this kind. The grand object to

be attained in fractures of the maxillary bone, is to bring the fractured parts accurately together, and to retain them there. For this purpose rubber splints over the teeth are recommended as more efficacious than any other means hitherto employed.

He states that these splints were first used by Weber, but does not give the date at which he first used them. It is well known that these vulcanized rubber splints, adapted to the teeth, have been in use for several years in this country, but by whom they were first employed is not so evident.

A discussion followed upon this subject, and upon operations for the removal of parts or the whole of the maxillary bones, together with remarks upon defects of the palate, nose, etc., and a consideration of plastic operations for remedying such defects, and when this is impracticable, of mechanical appliances employed in such cases.

The *Druggists Circular* has the following, taken from *Chambers' Journal:*

"Many persons believe that beef-tea is very nourishing, and that it is an excellent strengthener for people of weak health. This is a mistake. Some few practitioners and chemists have long been aware of the fact, and now their view is confirmed by Dr. Marcet. There is no nourishment in beef-tea. Mixed with solid food, it imparts a relish which promotes digestion; and the best solid that can be mixed therewith is the beef from which it was made, reduced to a powder. In two, at least, of the London hospitals, the mixing of powdered beef with the beef-tea has been practiced, and there the patients get strong on a beef-tea diet. It is worth remembering, too, that the objections to beef-tea apply equally to the preparation described as Extract of Meat, with the further disadvantages that the extract is always stale."

In the *Medical Cosmos* we have an extract from Prof. E. A. Parkes' Croonian lectures, reported in the *Medical Press and Circular*, detailing certain experiments instituted to determine the effect upon the human organism which would be produced by cutting off all supply of nitrogenous food. From his experi-

ments upon patients, he concludes that if all nitrogenous food be cut off for five or six days, it does not materially affect the voluntary muscles, but it produces very marked effects upon the involuntary muscles, and he thinks we may in that way control the action of the heart, and probably prevent the rapid proliferation of cells in morbid growths, and perhaps control to a great extent the growth of cancers. The suggestion seems worthy of being tried.

The fluid extract of red clover, taken internally, is recommended by another writer for cancer, and its claims to a trial seem to be pretty well sustained by several practitioners who have had some experience with it.

In the *Boston Medical and Surgical Journal* oxygen is recommended for purifying the wards of hospitals. In hospitals where hospital gangrene had made its appearance, oxygen in considerable quantities was thrown into the different wards every morning and evening, and the gangrene quickly disappeared.

Dr. Spessa, of Italy, states that a solution of morphia injected into a fistulous tract, acted, during an operation performed by slitting up the fistula, as a complete local anæsthetic.

From the *Medical Record* we learn that Dr. Hatch, of Sacramento, California, reports four cases of fatal hæmorrhage from lancing the gums in children. There must have been culpable negligence in the operation, or after treatment, or these children must have been of a very decided hæmorrhagic diathesis.

In the "Lynn Medical Society," Dr. Ahearne recommended *essence of pepermint* as a local application in headache, especially in headache of a nervous character.

BIBLIOGRAPHICAL.

MEDICAL EDUCATION IN AMERICA. By Henry J. Bigelow, Professor of Surgery in Harvard University.

This address, which was read before the Massachusetts Medical Society, has been printed in pamphlet form, and makes a very readable book of eighty-three pages.

The author commences by stating: "if there is any idea which I particularly desire to present distinctly in these remarks, it is that of utility in medical education."

After arguing against "exacting from adult students collateral acquisitions which in practice they will not need," he says, "still there is a limit to this line of argument. No student or artisan is the worse for an outlook upon kindred arts and sciences, which will help him to establish the true relations of his own," etc.

He would divide the profession into two classes. One of which should comprise those who do the practical work of the profession, and the other those who are expected to contribute to the development of medical knowledge, and thinks there should be a difference in their training, to fit them for their different pursuits.

He thinks "the excellence of the practitioner depends far more upon good judgment than great learning."

The author condemns in unmeasured terms vivisections upon animals in physiological demonstrations, as useless in a great majority of cases and barbarous. He pays a high compliment to the German schools of medicine, but does not think the German system can be successfully substituted for our own methods of instruction. J.

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